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THE GIFT
OF LIFE

THE GIFT OF LIFE

A Book for the Young:

INTENDED TO PRESENT TO THEIR MINDS SOME OF
THE BENEFICENT PURPOSES OF GOD IN
LIFE AND CREATION.

BY SARA WOOD,

AUTHOR OF "CHILDREN OF OTHER LANDS," ETC.

"In Him we live and move and have our being."—THE APOSTLE PAUL.

"The Lord is good to all, and his tender mercies are over all
his works."—HEBREW PSALMIST.

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MARK LANE.

PREFACE.

THIS little book is intended to assist Parents and Teachers, in giving to their children a conception of God, as the Giver of Life.

It seems to the writer that we should not limit ourselves to presenting to the young, ideas only of God in Heaven—afar off and away from them; nor only as revealed to one people in distant times; but should also seek to represent Him as near them *here*, and with them *now*, giving and sustaining life; bestowing all the wonderful powers of his creatures; enriching their lives with all that is useful, good, and beautiful; and filling each day and hour with countless blessings and joys.

It is not possible to give religious impressions systematically, but we can give instruction in a connected form, through which they may be produced; and the object of this little book will have been attained, if the young who may be led to study it, shall receive through its contents an enduring sense of the lovingkindness and tender mercy of God, as shown in our natures and lives.

Since the more we know of such matters as are treated of in the following pages, the better we are able to perceive the good that is everywhere purposed by God, it is hoped that further knowledge on each subject will be sought for in more advanced books.

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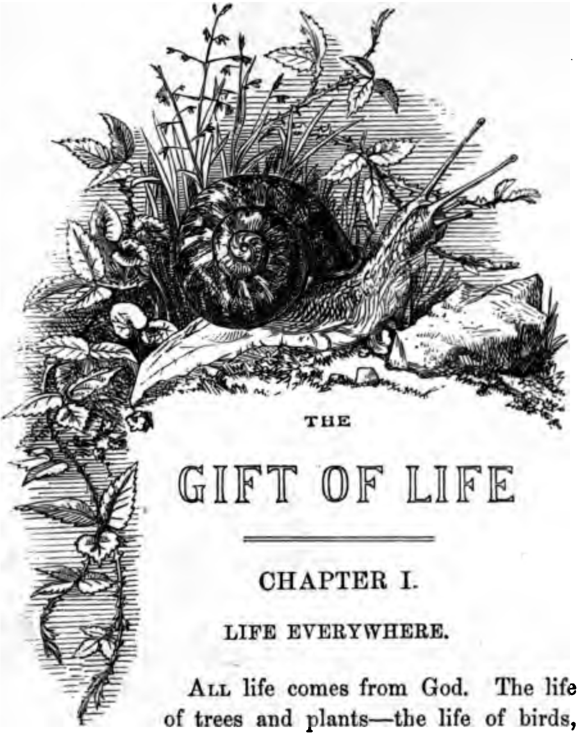


THE GIFT OF LIFE

CHAPTER I.

LIFE EVERYWHERE.

All life comes from God. The life of trees and plants—the life of birds, beasts, fishes, and insects—and the life of men, women, and children. Men can carve figures which have the forms of human beings, with every limb and feature in right proportion, and which are *life-like* in their attitudes; they can paint pictures of living creatures and things which resemble them in form and colour, and which represent actions and movements like those *of life; they* can make clever machines to do *work for them, which* can move swiftly, carry heavy burthens, lift heavy weights, spin, weave, and cut; but they cannot give life to the work of their hands. God alone is the giver of Life.

We know well what we mean when we say that a thing has *Life*, or is *Alive.* Thus, if we compare together a snail, a tuft of grass, and a stone, we know that the snail feeds itself and has grown, and can move about at will; that the grass has been nourished by the moisture of the earth, and has also grown; but we know that the stone has neither fed itself nor grown, and that if left to itself it would remain for ever in the same place: we say that it is *life-less.*

The life of plants and trees is called VEGETABLE LIFE; the life of birds, beasts, fishes, insects and reptiles is called ANIMAL LIFE; the life of men, women, and children is called HUMAN LIFE.*

Scarcely any portion of the great globe on which we dwell is without some kind of life. Its hills, valleys, and plains are covered with countless kinds of grasses, mosses, plants, and trees. Thick forests are spread over large portions of the continents and islands, and clothe the sides of mountains. Vast plains and chains of hills are carpeted with grass. Fruit-bearing trees, flowering-plants

---

* It is left to be taught in more advanced chapters that, in accordance with physiological resemblances, human life must be classed under the general term of animal life.

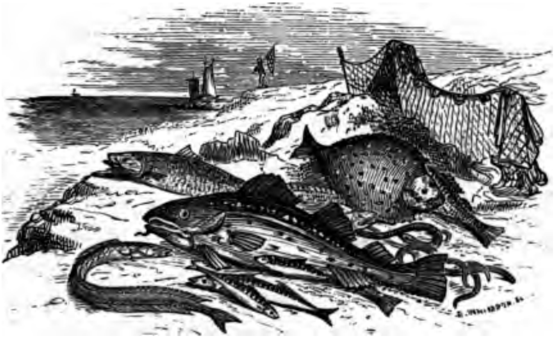
and shrubs, suited to the different soils and climates, are found everywhere. Even rivers and streams have their reeds and rushes and water-plants; and the sea has its weeds, which, when the tide is out, are found covering the sands and growing on the rocks in thick clusters. Scarcely a stone upon the mountain side is without some small moss or lichen upon its surface. Very different are all these forms of vegetable life in their size and nature. In the islands of the southern seas, are pine trees which grow to the height of 200 feet: others in California reach the height of 230 feet—such as the Wellingtonia, which is as high as many a church steeple. In the countries of the tropics, palm trees grow to great heights; and in India the Banyan sends down sup-

ports to its great branches which take root, and the branches, thus supported and nourished, spread out in every direction, sending down more and more thick props, till a whole grove is formed by a single tree. Such vegetable growth as this is a great contrast to the small duckweed which floats upon the surface of our ponds, or the tiny mosses which cling to stones. Even the green scum which we see on the surface of stagnant water is a form of vegetable growth, and so is also the mould which comes on damp walls, on cheese, and on sour paste. These latter are among the lowest and simplest forms of vegetable life, while the flower and fruit-bearing trees are the highest.

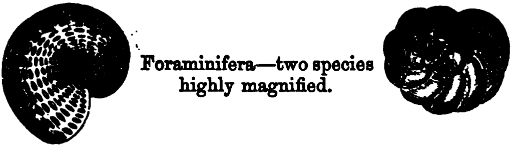
Equally full is the world with animal life. Millions of quadrupeds of different forms and natures are found in every country. Some that live in a savage state, roaming over the desert and preying on other animals; some that shelter themselves in thick forests, and

browse upon the foliage; while in the inhabited parts of the earth, animals useful to man are protected by him, and are to be seen grazing in every meadow and on every hill.

Those parts of the globe which are covered with water, are also full of animal life. The great oceans and seas swarm with fishes of endless varieties of form and size. Some inhabit only the deep waters, while the shores of every country are covered with soft-bodied animals protected by shells, like the whelk and oyster, or others with jointed limbs, like the crab and lobster. *Every river, stream,* and fresh-water lake has its in-

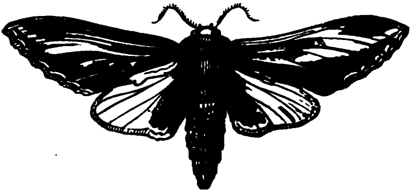


habitants; and even a drop of stagnant water from a ditch or pond, when seen through a magnifying glass, is found to be full of living creatures. It has lately been discovered also that at the bottom of the deepest oceans there is animal life in very minute and simple forms, each creature a mere speck of life, and millions of them taking up the space only of a single oyster, and yet some of these very minute animals are found to be covered with delicate and beautiful shells. A strange contrast do such forms of animal life present to the great whales of the Polar seas, 100 feet long, or to the elephant of the hot countries of the tropics, with its thick and heavy body; or even to the horse and dog which we know so well, with their sight and hearing and quick intelligence.



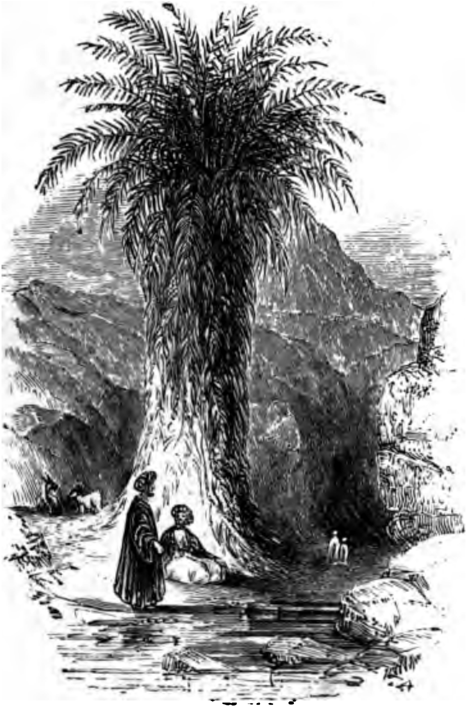
Foraminifera—two species highly magnified.

The air which surrounds the globe is also full of life, with all the endless variety of birds, from the great eagles, which make their nests upon the highest rocks, the tall ostriches which live in the desert, and stride rather than fly, to the tiny humming bird, which can bury its body in the cup of a flower as it sucks out the honey; while butterflies and insects, wonderfully varied in their forms and habits and ways of life, are found everywhere in endless profusion.



The manner in which the great world is filled with human life is still more wonderful. Each portion of it, whether hot or cold or temperate, has its races and tribes of men, whose natures are accommodated to the climate and character of the countries they inhabit. Thus, the Esquimaux and Laplanders can live comfortably and happily in the extreme cold of the North Pole, and the Negro and Bushman live as comfortably, and happily, in the burning heat of Africa. Each adapts his life to what he finds about him, and has faculties or powers for so doing; but all the different races of men have much in common, and are like each other in what makes them human beings, though their skins may be black, white, or brown, and their speech and features very unlike.

A great portion of the vegetable and animal life of the world seems to be intended to help towards the support, the comfort, and the perfection of human life; and we see by the superior powers which the Creator has given to men, that the highest and most perfect kind of life is human life.



CHAPTER II.

LIFE A GREAT GOOD.

LIFE gives us so much to enjoy—so much comfort and pleasure—that we all wish to keep alive. No one wishes to die before he is old, and we grieve when children and young persons die. We feel that we should have liked them to continue in life, and fulfil all the purposes for which they were created, and enjoy all the blessings, and privileges, which life can give. We know that though they might have lived to feel sorrow and disappointment and pain, yet that life would have been a good thing to them. We are so sure, too, that all living creatures have enjoyment in life, that we regret when even animals are killed uselessly. As children run about, and dance, and sing, and play, it is easy to see that they feel it good to be alive; and if we watch the gambols of young kittens, or of lambs in the field, or listen to the warbling of birds, and humming of insects, or observe a butterfly fluttering from flower to flower, or the fish in a stream darting here and there in the yielding water, we are sure that they enjoy their lives and are glad to be alive. It is, however, when we come to observe more closely the habits of all animals, that we see how it has been intended that their life should give *them a pleasurable* feeling, and how they all have a desire to preserve it. Each creature seeks to avoid danger, and death, and has powers that give it a chance of doing so. A bird can spread its wings and fly away, if you attempt to catch it. A snail, if you touch it, can shrink into its shell. Most quadrupeds have the power of swift running when they would avoid being taken, like the hare; or have weapons of defence in their horns, claws, or teeth; or have spines like the hedgehog and porcupine; or thick horny coverings like the turtle and tortoise. Many insects are provided with stings to use for the preservation of their lives. Others have a wise forethought given them by nature, which enables them to meet a coming danger—as the bee, for instance, when it collects honey, and wax, from flowers during the summer season for the preservation of life during winter; the wax being used for the formation of the cells in which the honey is stored. Some *means of* defence or protection have been given to each *creature, and* though many have been destined to be-

come the food of others, yet each seems to have at least a chance of escaping. Even those wild animals which are sought for by men in order to be used as food, such as fishes and birds, can often by their swiftness of motion escape from the nets spread for them, or from the sportsman's gun, and live to the natural end of their lives.

The Creator seems thus to have given to each creature a sense of the value of life. The most poor and miserable of human beings look upon life as something to be treasured and preserved, and we consider those who put an end to their own lives as diseased in mind. The human race could never have been preserved upon the earth if it had not been for this desire to continue alive, since men have fewer natural means of protection than many animals. They have no natural clothing, and no weapons of defence in their bodies, as have many animals; but the powers of their minds supply these wants, and even savages find out means of sheltering themselves from the cold of winter, and the heat of the sun, and contrive for themselves clothing, and weapons with which to kill animals for food, and capture birds and fish. The strong desire to live, which even such men feel, quickens their faculties, and sharpens their wits, until they find out means for their self-preservation, and also for the preservation of their young. The love of life has been needed to keep the world peopled with human beings, and has led to all the improvement that has taken place among the races of men in their *manner* of living.

Even the feeling of pain is a means by which we are *led to avoid danger to life.* A child who puts his finger in the flame of a candle, and feels the pain of burning, will ever after avoid fire. Pain in any part of the body, which is diseased, warns us to try to set to rights what is going on wrong; it is like a signal of danger showing that life is menaced. Even the affection which parents feel towards their children also helps to protect and preserve their tender lives. From the first moment of its birth, an infant requires care and attention, and constant watchfulness, or it would die. Though a mother knows well that her child, if he grows up to be a man, will meet with sorrows and trials, yet still she feeds him carefully, and nurses him tenderly when he is ill, and does all in her power to preserve him in life and protect him. She knows that life is a privilege and blessing, and that it will bring him pleasures and enjoyments, and also duties, and that those duties may become pleasures and sources of happiness to him. Animals, that cannot think of this, have what we call an *instinct*, which leads them to shelter, and nourish, and protect their young. Thus a bird, which does not require a nest for its own comfort, sets to work, and with infinite pains and labour weaves one of twigs and straw in which its young is to be nursed, or, like the

swallow, builds one up, little by little, of clay, which is carefully placed under the shelter of the eaves of a roof. Some insects seem to know that their offspring will require a certain kind of food for the support of their lives, and lay their eggs where they will get it, each grub or caterpillar, when hatched, finding near at hand, through the forethought of the parent fly, the food which suits it. When human beings grow up, and employ all their powers, and use their lives rightly, they feel more and more the happiness which life can give. They attain to a higher kind of happiness than that of any animal. We may almost say that they have more life—they see, hear, understand, and do so much more than animals; and our greatest aim should be to raise ourselves above that which we have in common with animals; to make as much use as possible of our powers of thinking and understanding; and while, in order to live, we must nourish our bodies with food, yet, in order to live a higher kind of life than animals, we must seek to nourish our minds with knowledge; and a wonderful distinction exists between men and all animals in the fact that they can improve themselves. There seems no limit to the power which men have of gaining more and more knowledge, and of doing and making things more and more cleverly; but animals *have no such power.* What they are in our days they

were thousands of years ago, and will be thousands of years from this time. Even those animals who seem to do some things cleverly, like the bee making its waxen cells, or the bird building its nest, never improve, or do their work better one time than another. We cannot, too, compare the happiness of any animal with that of human beings. Ours is a much higher kind of happiness, as ours is a higher kind of life. Perhaps the greatest happiness felt by any living thing is that of those grown-up human beings whose minds are full of knowledge and whose hearts are full of love; who can perceive the beauty that is everywhere in the world, and who are constantly seeing and feeling that everything is made good and beautiful by the love of God.

CHAPTER III.

HOW WE ARE KEPT ALIVE.

NOT only do our lives come at first from God, but we are made to go on living by His care. Our bodies are so formed that we are kept alive from hour to hour, from day to day, and from year to year. To live is, in fact, to have that going on within our bodies which makes us grow, which builds up and preserves our bodies, and which continues us in life. Wonderful contrivances are found in the construction of our bodies to do all this. When we say that human beings, animals and plants, differ from stones because they grow and are nourished, we soon see that this difference arises, in the first place, from their having parts which perform certain actions or offices. These parts are called *organs*, and, from having organs, human beings animals, and plants, are called *organic*, while a stone or piece of iron are said to be *inorganic*, which means *having no parts or organs.* The organs on which life and growth in human beings and animals most depend are the stomach and lungs. In order to continue alive we must take food into our stomach and air into our lungs. Every breath of air that we draw in helps to nourish and keep alive our bodies. Every mouthful of food that we swallow helps to build up our bodies and continue *our lives. Food and air* are to our bodies like the brick and mortar that helps to build up a house. We want air even more than food, for it would not kill us to go without food for a day, but we should die if we went without air for many minutes. The feeling of hunger is the warning given us that our bodies require a supply of food; but as air is so constantly needed for us, we are made to breathe without any thought about it. When a child is born into the world, it begins, from the first moment of its life, to take air into its lungs; it cannot help doing so, for to live is to breathe, and air is often called the breath of life. If the passages by which air gets to the lungs are closed up by disease, death is sure to follow; and if we were to stop up our mouths and nostrils we should be suffocated and die. There is a machine called an air-pump, by means of which the air in a vessel of glass can be sucked out; and it can be shown how necessary air is to animal life by putting a mouse under this glass, when, by pumping away the air, the little creature pants and gasps for a while, and then dies. Thus it is with all animals. Even fish require air; and if the air contained in water is not enough for them they rise to the surface of the sea, river, or pond, and take it in. The lungs of birds are constructed so that they take in as much and no more air than they want.

Air is also as much needed for plants as for human beings and animals. From the moment that the plant begins to spring up from the seed it begins to take in the air and moisture, which help to build it up and form its stem, leaves, and flower, &c. It has parts or *organs* which perform the same offices for it as the *stomach and* lungs of animals and human beings. Thus we see that all which composes our food has required air for its life and growth. The little plant which produces the corn of which our bread is made, and the sheep whose flesh we eat, and the cow whose milk we drink, require air to keep them alive as well as ourselves.

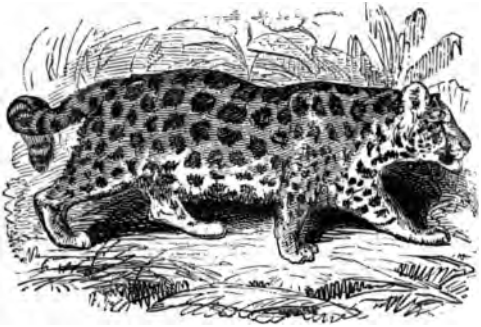
Since air is so much needed for the life of all creatures and plants, it is provided abundantly everywhere. It fills up every space, and is all around us, in doors and out of doors. It extends high up above the surface of the earth—higher than the tops of the highest mountains. It surrounds the great globe on which we dwell like an outer covering wrapping it round, and the name of *atmosphere* is given to it, which means *round about the sphere or globe.* In proportion as it is near the surface of the earth it is *dense*, or thick; while it becomes more *rare* and thin as it extends itself above the earth. At the top of high mountains the air is too thin or *rare* for human beings or animals to breathe comfortably, and sometimes it is too dense or thick in close rooms for the lungs to take in easily. Health depends very much, in both men, and animals, and plants, on the air they take in being pure, and of the right kind; and there can be no life where there is no air. If there were any place where there was no air, we should be sure that there no human being, animal or plant could live. And as we are thus so abundantly supplied with the air needful for our lives, so does the great world on which we live bring forth in rich abundance all that is necessary for our food. Our life is supported and our growth depends on animal and vegetable life. Everything, in *fact, which we eat and* use for food is composed of something which *once had life itself*, or has been part of something which had life; and wherever human beings are found upon the earth, there we may be sure is some form of animal or vegetable life which can serve for food. The infant is nourished at first from the breast of its mother, but soon requires other food, and it is necessary for the growth and strength of manhood that the flesh of animals, and the roots, seeds, and fruits of plants should be taken into the stomach in order to produce the materials out of which our flesh, bones, blood and muscles are formed. And the lovingkindness of our great Creator is shown in the plentiful supply which is provided of all such objects as we can convert into food. Nothing, for instance, grows more readily and can be produced in greater abundance than all the different kinds of corn of which bread is made, whether it is the wheat of which we use the tiny grains, or the tall maize, with its thick cobs of seed, which in more southern countries than ours is made into bread. In some climates, like that of England, human beings require many different kinds of food in order to be well nourished and healthy; but in some other parts of the world life can be supported principally on one article of food, as with the Hindoo or Chinaman, who can subsist almost entirely on rice; or the South Sea Islander, who wants little more than the fruit of the cocoa-nut tree for the nourishment of his body; or the Laplander, who feeds almost entirely on the flesh and milk of the reindeer. In all these cases human beings like best the food thus provided for them, and the goodness of God *is still* further shown by it being a pleasure to us to eat *and satisfy* our hunger, and so nourish our bodies, and a pleasure to us especially to eat of those things which supply most nourishment.

Thousands of years ago the hearts of men were filled with grateful love as they perceived the tender mercy of God in making the earth so rich in the abundance of food provided for all living things. In the Psalms of the Old Testament are many expressions of gratitude towards the great Creator with respect to food, as when it says: "Oh Lord, how manifold are thy works! in wisdom hast thou made them all: the earth is full of thy riches. . . Thou givest (all creatures) their food in due season. *That* thou givest them they gather. Thou openest thine hand, they are filled with good." And the grateful writer adds: "I will sing praise to my God while I have my being."

CHAPTER IV.

HEAT NEEDED FOR LIFE.

EVEN food and air could not keep us alive if we had not warmth in our bodies. Heat is very necessary to life. We must keep up the natural heat of our bodies or we should die. When people are exposed to such severe cold that their whole bodies lose their natural warmth, they die, and we say they are frozen to death. Travellers lost on the snow-covered mountains—sailors exposed to the cold on their wrecked vessels—and the houseless wanderer in our streets, will die, because the warmth has not been kept up in their bodies which is needed for life. It is not enough that we get our food from the products of the earth, and are supported also by the air we breathe; but the heat which comes from the distant sun is needed for our lives. The amount of animal and vegetable life, too, in any country of the world, is almost in proportion to the amount of heat which comes to that part of the earth from the sun. In the tropics, or that part of the world where the sun's rays fall directly upon the land, and the sun at noon is quite overhead, there is more luxuriant vegetable life and quicker growth than with us. In these countries there is no fall of the leaf, and no winter. The forests are full of tall and stately palms, and large-leaved plantains, and tree-ferns, with beneath a tangled jungle of flowering plants and trailing vines, amongst which myriads of brightly-plumaged birds, and chattering apes and monkeys, buzzing insects and silently crawling reptiles and snakes, find their food and shelter, while they are the abode also of the large quadrupeds which are beasts of prey, like the lion and tiger. In the swamps of these hot regions, where there is ever a steaming moisture in the air, thick beds of reeds, and rushes, and water-plants, are the homes of thousands of frogs and lizards and water-birds. In such countries crops of corn and rice spring up, and come to maturity and ripen in a few weeks; while the dates, and cocoanuts, and plantains, and bananas, on which the inhabitants also depend for food, are to be gathered all through the year. In the temperate portions of the globe, where during winter both animals and vegetables seem to lose some portion of their life, we see even as plainly the effect of the sun's warmth each spring, when, on the return of more sunshine, the buds swell



and unfold into leaves and flowers, and blossoms open out, and the seeds which have lain in the earth during the winter quicken into life, and growth begins. Very far north, and near the pole, where the sun rises only a little height above the horizon at noonday, and sends upon the land but few of its rays, there is very little life of either animals or vegetables. Few quadrupeds and birds are to be seen, and dark firs and pines are almost the only trees, while in the place of green herbage is only a brown moss beneath the snow, which the reindeer makes his food, after shovelling off the snow with his spade-like antlers. Quite at the North Pole the extreme cold prevents the existence of any living things, and all is still, and barren, and bare; and the sea is but a mass of ice which never thaws.

It is not, however, only the heat of the sun on the earth, or the warmth which we get from our fires of coal and wood, with which we supply heat to our bodies: nor is it this kind of heat which is alone needed for life; for the air we breathe, and the food which we eat, help to keep up at all times the heat which our bodies require. We breathe in air and we take in food to keep our bodies warm, as well as to nourish them. We take air into our lungs, and we put food into our stomachs, as we put coal on the fire, in order to keep up our heat. Air and food serve, in fact, as fuel to keep burning the internal fire which is our life. Some kinds of food help to give heat more than others—such as bread, rice, &c.; some give more nourishment to the body—such as meat. The clothing *we put on is* not so much to give warmth to the body, *as to keep in* what is there. When it is cold weather, our warmth would pass into the cold air around us, if we did not keep it in with warm clothing. Animals have coverings given them by nature, such as furs, feathers, and thick skins; all which help to keep in their body's warmth.

One of the best ways, too, in which this life-warmth is kept up and increased in our bodies is by motion: by the activity of our limbs; by exercise, such as running and walking, and especially by all kinds of labour. The necessity for labour or work could never have been inflicted on human beings as a punishment or curse; for we see, on the contrary, that it is a good thing for the body to be actively employed.

Heat, too, is needed, not only for the support of human life, and for the first quickening into life of the seed of vegetables, but it is needed also for the first beginning of animal life. The eggs of all birds and insects require heat to hatch them. The hen bird sits on her eggs to give them the warmth of her body, and *takes care not to* leave them long enough for them to get cold, or the eggs would never be hatched into birds. We put the eggs of the silkworm into the sun when we want the young caterpillar to come forth. Almost all other animals whose young come forth from eggs, take care to deposit them where they will get the heat of the sun.

We thus see that as the far distant sun ripens and brings to maturity all the fruits and seeds which we use for food, it is also its heat which quickens into life and growth the germ in each seed and egg. Some nations of the earth have felt so fully the blessings which come to the world from the life-giving sun, that they have made it the object of their worship. At Madras, in India, the sect of people called Parsees may be seen going forth in crowds in the early morning to worship the rising sun, as it is seen coming up above the distant horizon of the sea. We do not pay reverence to the sun itself, but when we think of all the blessings which come to us through the light and warmth which it sends down to us, we give our gratitude to the great and beneficent Creator of the sun.

CHAPTER V.

THE SENSES.

Much of the pleasure that we have in life comes to us from our senses: the sense of sight, the sense of hearing, the sense of taste, smell, and touch. What our senses bring to us in the way of thought and feeling makes our life. The lifeless stone has no consciousness of anything about it. The sun which shines upon it, and the rain which beats upon it, give it no sensations. Even the snail is full of feelings or sensations compared to it, and is conscious of cold and warmth. It can see objects by means of its eyes, placed at the top of its horns, and can taste the juicy leaves which form its food. With ourselves, all that *we know, and all* that we enjoy, comes to us through

our senses. We know, first of all, through our senses, that other beings and things exist in the world besides ourselves. They place us in connection with what is outside and beyond our own bodies; for if we did not *see* or *hear* or *feel* other objects we should not know that anything but our own selves existed.

And besides this knowledge, let us think of all the joys that come to us by means of these senses of ours. How pleasant it is to behold again the light of day after the dark night—to feel the warmth of the sun, and to see everything bright with its rays. We like to hear the voices of people, and the sound of music, and the songs of birds. We enjoy nice food, and the taste of sweet fruits, the smell of flowers, and the feeling of the soft air as it is wafted upon us, and the touch of the cool water as we wash and bathe. All these things help to make up our lives, and render it a pleasure to live; and yet they are so common that we forget sometimes how much our happiness depends upon them. If we look back in the evening upon any day that we have passed—even a day that has brought us no unusual happiness or joy—we may see how much we have had in our power to be happy through all these abundantly-supplied blessings. We live day after day with other people—our relations and friends, and do not always remember what a constant comfort and joy it is to see the faces of those we know and love, and to hear them speak, and to have them to listen to us when we tell what we think, or feel, or want. The prisoner in his lonely cell feels it a terrible punishment to have nothing *to see,* or hear, and no one to speak to. He rejoices *to be allowed* even a glimpse of the sky, or to see now and then the face of his jailor. He counts the hours and the minutes to the time when some one will come to speak a few words to him.

If, too, we want more fully to understand the blessings of sight and hearing, we need only observe those who are blind or deaf. Life to them is a very different thing to what it is to us who see and hear. What would not a blind man give for one day of sight!—one day in which he could look up to the sky, or see the green fields, and leafy trees, or sparkling river or sea—one day in which he could read a newspaper or a book, and still more glad would he be to have one day in which he could see the faces of his friends and relations. What would not the deaf man give to be able to hear all at once the talk of people around him—the sound of sweet music, or even the bustle and noises of the streets! There have been a few persons born into the world without either the sense of sight or hearing, and the only way in which it has been possible to give thoughts to their minds has been through the sense of touch, and it has been found that merely to feel the hands of their fellow-creatures has given them pleasure, while it has been with the greatest trouble and difficulty that by means of the sense of touch a little knowledge has been given to their minds. How different is it with us, when, through the senses of sight and hearing, knowledge comes pouring into our minds at every moment!

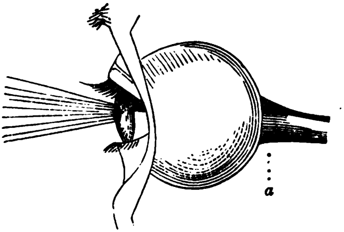
We can see that our senses have been given to us by our Creator, to put us in connection with the universe around us, and *to give* us *thought*. An infant, when it *begins to notice objects,* and to be conscious of sounds, begins to have thoughts within its mind, though it has no power to express them. Our minds depend upon our senses for getting ideas, and the happiness, as well as the usefulness of our lives, depends upon the way in which we employ our senses. We can use them too little, or we can waste them upon objects which bring no thought to the mind worth having; and we can seek to gratify one sense at the expense of others. How little, for instance, do those understand the value of their powers who would rather gratify the sense of taste with nice food than exercise the sense of sight upon a beautiful view, or a fine picture, or an interesting book. The mere taste of food leaves no thought worth keeping in the mind, while the picture, the view, or the book may bring thoughts which remain impressed on the mind for a whole lifetime, and give pleasure every time they are remembered. Some people live in the world without gaining half the pleasure and advantage that they might have from their senses. They have eyes, but they do not try to see and observe what is about them. They have ears, but they do not listen, and seek to understand what they hear.

By constant exercise the senses can acquire great quickness, and acuteness, and accuracy, and we are never so certain of the nature of anything as when we have used two or three of our senses in examining it. Thus, if some one laid on the table before us a ball-shaped object of a deep yellow colour, our eyes resting on it might lead us to say it was an orange. But it might be round, and of a deep yellow, and yet be only a painted ball. If we take it in our hands, and feel its surface, we think by the way it yields to pressure, and the little roughnesses on its surface, that it is certainly an orange, and we can see, too, where the stalk was which held it on to the orange tree; and if we make use of another sense and smell it we are pretty sure that it is an orange; and then when at last we cut it open and see the pulpy inside, and taste some of the sweet juice, we cannot doubt at all about its nature—our minds being made sure by the evidence or proof given us by our senses of sight, touch, taste and smell, that it is the fruit we call an orange. For our comfort and convenience in every way, it is best to make good use of all our senses, and our lives almost depend upon their being exercised—while, by their being employed in such a way as can bring pleasurable thoughts and feelings to our minds, God has made them the sources of the greatest happiness our lives can afford.

CHAPTER VI.

SIGHT.

None of the powers given us by God are more valuable to us than the sense of sight. Nothing that we possess is more precious to us than our eyes. They are the most useful servants that our minds have at command. They bring us light, or we should grope in darkness. They show us the colours and forms of all the objects that are around us. The eyes are called the *organs* of sight, because they perform the office of seeing, and they are in close connection with our minds, or with that within us which thinks and knows. The way in which all the *organs of sense* convey thoughts and feelings to the mind is very difficult to understand. Perhaps no one quite knows how it comes about; but it is certainly by means of delicate little threads or fibres, called nerves, which pass from the organs of sense (the eye, the ear, the nose, &c.) to the mind; and very much as a message is conveyed along the electric wires of the telegraph is the sense of sight, hearing, smelling, &c., carried along the nerves to the mind. Our eyes are placed most conveniently for bringing us plenty of knowledge of what is about us. Their being placed in the front of our heads enables us to see where we are going and avoid any danger that might approach us. They are set in hollow cavities or sockets in our heads, and by means of elastic strings called muscles we can move them about from side to side, or up and down, in order to see what is round about us, and above and below us. They have lids to cover them up carefully when we sleep or do not want to see. These lids have delicate fringes to protect them from dust, and to shade them from too much light. The ball of the eye is most wonderfully constructed for letting in the light upon the nerve that is to give the sense of it to our minds. A little picture of all the objects before us is reflected on this nerve, where it is spread out like a network at the back of the eyeball. As we stand and look at a flower, the tiny picture of it made on this spread-out nerve carries the thought or idea of the flower instantly to the mind. If the flower is red, the mind knows that it is red. If it is blue, the mind knows that it is blue. If our eyes are turned upon a jug on the table, we know in the same way all about the colour, shape, and size of the jug, because of the little picture reflected on the nerve at the back of the eye. A blind man would have to feel the jug with his hands in order to learn something of its shape and size, but could never know anything about its colour or of



a the nerve which conveys the sense of sight to the mind.

the pattern painted on it. Light enters the eye at the black round spot in the centre, called the "pupil," and has to pass through several transparent coatings, which serve different purposes in helping to form the picture of what we see, and in reducing large and distant objects to a very small compass. We can judge, by the size of the eye, how very small must be this picture upon the *eye-nerve*, and how wonderful is the fact that the sight is able to take in miles and miles of land or sea, and hundreds of trees, and horses, and ships, &c., when we look out upon a distant, widespread view. If the eye were quite still, we could only get a picture of what was just before us; but by means of the muscles of the eye we can turn it about in every direction, so as to take in all these objects so swiftly that it seems to the mind as if we saw them all at the same instant. Wonderful, too, is the power which the eye has of sweeping over the widespread canopy of the heavens, so as to take in not only every flitting cloud, but the sun, moon, and stars, which are millions and millions of miles away from us. Let us think, too, of how rapidly and easily our eyes pass along the lines of print in a book, taking in every letter of every word, and giving as swiftly as a flash of lightning the meaning of the words to the mind!

Animals—beasts, birds, fishes, and insects—have eyes to help them to find their way about, to avoid danger, and to enable them to procure their food. The sight of some birds is very far-seeing and acute, enabling them when soaring high in the air to dart down on their prey; while the birds which live on *worms* and insects can see them from a distance when to our sight they would be invisible. Some insects—such as the spider—have eyes all over their bodies, the better to see their prey; others have them placed on pivots, so that they can be turned about easily. The snail with his eyes on the tips of his horns can draw them into his head when any danger threatens them. With all creatures the eye is a very delicate and sensitive organ, and especially is it so with that of human beings; and besides the protection given to it in the lid and the eyelash, it has been made so as to adjust itself to the light, and to take in only what is wanted. To do this, the pupil of the eye has the power of contracting or becoming smaller, or expanding and becoming larger. With a very strong light upon the eye, the black spot in the middle becomes very small; with little light, it becomes larger. Animals that have to seek their prey at nights—such as cats and owls—have eyes that can take in the faintest rays of light.

The wants of the body and the preservation of life we can thus see depend very much on the sense of sight, both with animals and human beings; but with animals, sight can hardly be said to help them to *think* and *observe.* If we only saw objects without *thinking* about them, and if we looked at a thing without *observing*, the sense of sight would do little for our minds. It is to those who perceive the beauty of what they see—who find out the uses of objects and the parts of objects—who compare and notice likenesses, and differences, and distinguish the meaning and fitness of things, and then reflect on what they have seen —it is to such *persons that* sight can furnish stores of ideas and thoughts, which become the highest pleasures of their lives.

So very greatly does our happiness and comfort in life depend upon our sight, and so many are the advantages that come to us through our eyes, that it seems as if each morning when we open them to the light of day, our first thoughts should be, "Thanks be to God for giving us the sense of sight!"

CHAPTER VII.

HEARING.

We hear with the help of our ears, therefore they are called the organs of hearing, though the parts outside our heads called the ears are but portions of the organs of hearing. Like our eyes, our ears are very useful assistants to our minds. They are constantly bringing us knowledge, as well as pleasure. Pleasant sounds help to make us happy, as well as pleasant sights. Even a very young infant likes to hear the voice of its mother or nurse, and as its mind grows a child learns to distinguish noises, and to understand the meaning of the different sounds made by people when they speak; they get to understand language, and then knowledge comes pouring into their minds. Most wonderful is the delicacy of the sense of hearing, bringing us faint or loud sounds, the sound of noises near us, or at a distance, and helping us to understand what is in the minds of others as they utter words.

As the sense of sight is carried to the mind by means of nerves, so it is by means of these delicate messengers that thought comes to us through our ears. All noises and sound arise from the air being disturbed or troubled. When a stone is thrown into the water it makes *little waves* or ripples, which spread *out in circles from the* spot where it first struck the water—and these circles go on spreading wider and wider to a distance until the surface of the water becomes still again. So it is with sound. Every kind of noise that is made, whether by a musical instrument, the human voice, or by objects striking against one another, as a hammer in hammering, or a stick in beating, or the clapping of hands, or the rushing of water, all such movements cause little waves or vibrations in the air, which spread in circles all around, and these little vibrations in the air entering our ears, the sense of sound is given to our minds.

The waves of sound are, however, not flat circles like the little waves on the centre of a pond when a pebble is thrown in, but are *spherical*, which means round in every direction, like a *sphere* or ball; so that we hear sounds above us like the thunder, and sounds beneath us as the rumbling of carts in a street when we are at the top of a house, and sounds which come to us from every side of us. We thus see that sound and noise must be first produced by the motion of something. Where nothing moves all is quiet and still. If we hear a noise in the house at night, we conclude directly that something has moved. If we are in a thick wood or forest in the still noonday, and after perfect silence we suddenly hear a rustle of leaves, we know directly that some creature has changed its place and disturbed the foliage, or that a little breeze has penetrated among it; or if we hear the report of a gun, we know that a man must have fired one, perhaps a mile off, and that the waves of disturbed air *have reached* our ears.

The part of the ear inside the head on which these small vibrations of air strike, which produce sound, is called the drum of the ear. It is a sort of membrane or skin like the parchment stretched over the end of a drum. If the entrance to the ear be stopped up so that the little wavelets cannot reach this part, no sense of sound is conveyed to our mind; and if it is injured in any way by disease, we become deaf.

We are sure of air being necessary for the production of sound, because it is found that when the air is drawn away from under a glass vessel, by means of the air-pump, a bell rang in the vessel gives out no sound. Loud and deep sounds are produced by large and slow vibrations of the air. Shrill, sharp and high-pitched sounds are produced by small and quick vibrations. When a substance or thing gives out sound readily we call it *sonorous*, and some substances, such as metals, are much more *sonorous* than others. Trumpets and horns and the pipes of organs are thus made of metal. The strings of musical instruments sound according to their size and the tightness with which they are stretched, and the fine and tightly-stretched strings can give quicker vibrations to the air than the loosely-stretched thick strings.

The sense of hearing is given to all the more perfect kinds of animals, and all quadrupeds and birds have ears. Many animals depend on their quickness of hearing to escape danger, and in some the sense is very acute. A dog pricks up his ears and rouses himself at the slightest sound, especially if that sound be an unusual one. He knows the voice of his master, and will obey *his call. He learns to* know the name that has been given to him, and to answer to it. We often depend on the quickness of hearing in a dog for taking care of our houses at night. A horse obeys all kinds of words and cries from his driver, but can be trained to hear without alarm the reports of guns firing and the loud thunder of cannon in battle. The little chamois on the mountain top will start into an attitude of watchfulness at the distant tread of the hunter on the soft snow, and will bound away from where the sound comes. There is good reason for thinking that insects can hear sounds too fine and acute to be heard by our ears, and the great elephant hears only noises which are loud ones to us.

It would be impossible to tell of all the pleasures and advantages that come to us through the sense of hearing. The sound of music to most people is a great pleasure. We are cheered and gladdened by sweet and merry tones played by instruments, and by songs sung by sweet voices. In the worship of God people like to express their praises and thanksgivings by means of solemn music; and many natural sounds, such as the warbling of birds, and the noise of falling waters, and the murmuring sounds of the sea waves, give an agreeable sensation to our minds. The many different sounds made by the human voice, giving different meanings to the mind, is very wonderful, and also the way in which we can vary the tone of our voices so as to express our feelings. How different is the feeling which arises in the mind when we hear the sound of merry laughter or joking words, to hearing the cries of pain, or the mournful tones of one who is in sorrow! When we attempt to express our thoughts upon any grave or solemn subject, and when we speak of God, the Author of our lives, we naturally speak in slower and lower tones than when we talk of other things; by which we see that different kinds of sounds are intended to raise up different kinds of feelings, as well as thoughts, in our minds. The lessons in this little book are intended to help young people to become conscious of all that renders their lives happy and pleasant, and to lead them to think of all that is GOOD, and feel grateful love to Him when they hear spoken the great name of GOD.

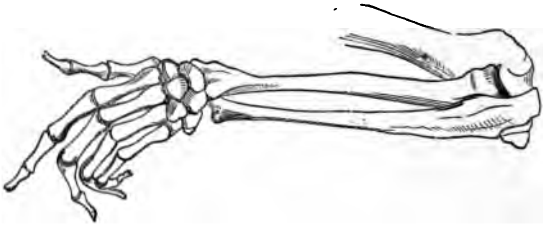
CHAPTER VIII.

THE HAND.

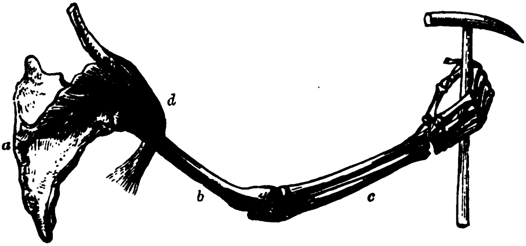
After the eye and ear, we have nothing that is more useful to us than our hands. As the eye is the organ of sight, the ear the organ of hearing, the nose the organ of smell, and the tongue of speech, so is the hand, or rather the fingers, the organ of touch. The whole surface of our body has the sense of feeling—it can readily perceive when another body comes in contact with it. It can tell whether that body be hot or cold, hard or soft, rough or smooth ; but if we want to know more about it—if we want to know its nature, its texture, and the exact degree of its hardness or softness, its cold or warmth, we must touch it with the tips of our fingers; for there it is that the sense of touch is most acute, and that the skin can but convey to our minds the knowledge of the thing touched. The touch of the fingers can sometimes correct the mistakes of the eye. The surface of something may appear to the eye to be smooth—we touch it, and find it rough; another rough, and we feel it to be smooth. It requires the touch of the fingers to find out many qualities in a substance, and to make ourselves sure of its nature. And here, also, it is by means of *nerves* beneath the surface of the skin and connected with our minds that we are able to learn so much through the touch. When the skin of the fingers is fine and delicate the sense of touch is very acute, and when—as in the hands of the labourer, who uses his hands in rough work—the skin has become thick and hard, then there is little sense of touch in the finger ends.

But let us think of all that our hands enable us to *do* in life, as well as to know. An infant only a few days old will grasp a thing with its tiny little hand, and then as it grows older learns to pull, and push, and pat, then to pick up and hold, and lift up and pull down. Still older, it is able to throw, and catch, and roll—to scatter, and cut, and tie, and lastly to write and sew. Still more wonderful is the endless variety of things that men and women are able to do with their hands: the houses, ships and churches that they build—the books they write, the pictures they paint, the statues they carve, and all the many conveniences for our daily life which are made by the hand, besides the constant preparation of food and clothing which is necessary for the preservation of life. Even when machinery is used for producing many of the substances and materials and things which we want, there is always much done by the hands of men and women, before they can be used. Work that requires *thought* must always be done by the hands, because of their power of readily obeying the mind. The parts of a watch, for instance, may be separately made by machinery; but the hands of a man or woman must put them together, with great care and nicety, each in its place, if the watch is to go correctly and mark the time.

All the usefulness of the hand arises from its *flexibility in addition to* its power of feeling, and this comes from the number of joints and small bones with which it is formed. When the bones of the hand are laid bare we find that each finger is made up of three separate little bones and three joints. Four bones form the back of the hand, and a cluster of small bones form the wrist. Altogether there are twenty-eight bones in the hand, and these are bound together



by tendons and muscles in such a way as to allow of all the movements that we give to it, and secure its strength as well as easy motion. The different length of each small bone of the fingers helps also towards the usefulness of the hand. As we double up the hand we can see how nicely the fingers close into the palm of the hand, which they could not do if they were all the same length, and we have only to injure the forefinger or the thumb in order to find out how particularly useful these two are to us in a variety of actions and movements. Much of the flexibility of the hand—its power of turning upon the wrist—depends on the movement of the two bones which form the lower part of the arm, between the wrist and the elbow. They are so contrived, as that one is able to turn upon the other by *means of* a rounded part at each end, fitting into a hollow part in the other, and they enable the hand to turn exactly half-round upon the wrist.



a Shoulder-bone.
b Arm-bone.
c Two bones which turn on each other to give motion to the hand.
d Muscle which gives motion to the arm.

Most wonderful is the facility and ease with which the hand obeys the wishes or commands of the mind. As we write quickly, the hand seems to move by itself; but it is very certain that not a single letter in a single word is formed without the guidance of the mind. Even for such little movements as are made in sewing, or playing on a musical instrument, the mind must first dictate them, or nothing would be done, although it often seems as if our hands went on by themselves, while we were thinking of other things. Some persons have more flexibility in their hands, and more delicacy and sensitiveness of touch, than others. A hand that is used only to dig with, or to wield a hammer with, is a very different instrument to the hand of a painter or sculptor, which can obey the mind so readily in producing beautiful curves and delicate strokes, which all put together make up the representation of what his fancy has conceived. The hand of a surgeon, *too, is able by practice* to perform the most delicate and difficult operations with wonderful precision and certainty; while the mind is carefully guiding it, so that it cuts exactly the right part, and the right depth.

We make our hands of great assistance to us in expressing our thoughts, and in serving instead of speech —as when we beckon to some one at a distance, or point to anything. We make them express our feelings sometimes, as when we clap both hands together in token of joy, or wring them in sorrow, or clasp them in pain or surprise. We press the hands of persons in our own to show our love or friendship, and when we would express our reverence for God we often fold our hands as we pray to Him, or thank Him for our blessings.

As the greatest happiness and usefulness of our lives depends on the exercise of our powers, so is it very desirable that we should all make as much use as possible of our hands. Those who are ready and apt in their employment are not only better able to help themselves and provide for their own comfort, but are always better able also to help others. The old Bible proverb, which says, "Whatever thy hand findeth to do, do it with all thy might," is very good advice; and all the thousands of useful and beautiful things that are in the world come from the owners of the hands that made them—doing with all their might, with all the skill and care possible, that which their hands could do. No animals have hands that can be compared with those of human beings. With his *hands* a monkey can just contrive to peel a nut, and *put it to his* mouth to crack—or can swing himself to the bough of a tree; but the monkeys of these days do no more with their hands than was done by monkeys thousands and thousands of years ago. Even if their hands were flexible enough, there would be wanting the mind that must always direct the hand that is to do any useful work. The great Creator of men, in giving them minds ever capable of improving more and more —of becoming more knowing and more skilful, and growing more and more desirous of gaining for their lives comforts and pleasures, useful things and beautiful objects—gave them also, as means by which their desires could be attained, these wonderful servants to the mind which are so capable of carrying out all its behests.

CHAPTER IX.

THE MIND.

WE have shown how the senses we possess of sight, hearing, touch and taste, add to our life, and bring ideas to our minds ; and we have spoken of our minds as something distinct from our bodies; and now we will endeavour to teach something more about these minds of ours, though there are many things about them too difficult for any one to understand or discover. The youngest child, however, may understand that our mind is that part of us which *thinks* and *feels*—which thinks thoughts and feels feelings. It is our mind which learns and knows, which feels sorry and glad, which hopes and fears, which likes and dislikes, which loves and hates. It is the mind which sets going all the movable parts of our bodies. We wish to move from the place we are in to another, and that wish acts like an order given by the mind to the limbs to begin walking. The wish or desire to have something which is before us, comes into our minds, and the arm and hand obey that wish, and we take hold of the thing wanted. We desire to see a thing, and the mind orders the eyes to move in the direction of it, so that the picture of it may be formed in our eyes, which *causes* us to see it. All the motions of our limbs are *performed by* means of our muscles, which are like bandages attached to our bones, to pull them this way and that, according as the mind desires them to move. Where the bandage is thick, it is made of what we call flesh, and is fastened to the bones by means of what we call gristle. In other parts the motion of our joints is accomplished by means of elastic strings called tendons; and all these muscles and tendons attached to our jointed limbs are under the control of our minds. Nothing moves—neither joint, muscle, or tendon—without first receiving a command from the mind.

This power of the mind is called the WILL; and without it we should do nothing in the world, and be of no use to one another, and no more able to help ourselves than the lifeless inorganic stone. We *will* to do every action of our lives, and to say every word that we speak. When our will is not strong, we doubt and hesitate, and do not act or speak; but when it is strong we act promptly, and speak without doubt or hesitation. When the will of a man is very strong at all times it is a good thing for himself and others, *provided he be a good man.* It leads to his performing great and noble actions, and to being of service to his fellow-creatures. When the will is strong and the man is selfish and wicked, it leads him to commit crimes, and to do harm and cause sorrow to others. Another power of the mind which is most useful to us, is that of memory—the power of keeping in the mind all the knowledge that comes to it through the senses, and all the experience that we gain as we go on living. We begin to use our memories very soon, and the more we exercise them when young, the more we know when we are old. *An old man of eighty* can sometimes remember very distinctly things which he heard and saw and learnt when he was a very young child; and a child when he learns his letters or to count at three or four years old has that knowledge stamped upon his mind for the whole of his life.

But even the remembrance of what we have seen and heard and learnt, and the recollection of all that has happened to us, would be nothing if it were not for a still higher and more valuable power of the mind, called REASON. Our reason helps us to compare one thing with another—to judge what we had best do—to distinguish right from wrong, and error from truth. It enables us to turn to account what has been taught us by our senses. It is the working of our mind by itself. If we compare our mind to a large storehouse, into which all manner of goods are brought to be treasured up, then we may say that our reason is like the owner of the storehouse, who sorts, and labels, and weighs, and compares, and arranges all the various kinds of goods, and gives them out for use when wanted.

Another very valuable power of our minds is that of being able to fancy and invent, which power is called the Imagination. We may describe it as a power by which what we have learned can be turned into new and beautiful forms. All the stories and poems that give our minds so much pleasure are the production of people's minds which have a great deal of this power, and all the most beautiful pictures and pieces of sculpture that are in the world have been produced by those who have a great deal of imagination or fancy, in addition to the skill of their hands.

But now it may be asked, Where is the mind that does so much, and in what part of the body is it situated? and in answer to this question we must own that we cannot see the mind, but can only find out its powers, yet we know well that all the powers of thought depend upon a soft substance called the brain, which fills a large part of the head. If the brain is injured, the powers of the mind are affected and injured; and if the brain becomes diseased, the mind can no longer think clearly or judge rightly. When people become insane it is because this soft substance called the brain is out of order. Without the brain, life could not go on for an instant; and so important is it to us, that it is most carefully encased in the bony part of the head called the skull, which is so strong that only a most violent blow or fall can crush it or break it. Closely connected with the brain is a soft pulpy substance which passes down our spine or back-bone, and is called the spinal marrow; and branching out from this, and passing through small holes in the spine, are all the fine nerve-threads which give us the senses of touch, sight, hearing, and tasting.

The nerves themselves are little hollow tubes filled with the same kind of pulp as the spinal marrow, and there are two sets of these nerves. Some which seem as if they carried messages from the brain when we want to move our limbs, are called *nerves of motion.* Those which carry impressions to the brain, and make *us see, hear, and feel,* &c., are called nerves of sensa-

tion. If we place our finger on a stone, it is because our brain has sent a message to the muscles of our arm and hand through some of the nerve-threads which run out from the spine, and when we feel the stone to be hard and cold, it is because some other nerve-threads have brought to the brain the sensation of hardness and coldness. In no part of the body are the nerves so numerous and so sensitive as in the face, because they are wanted there to take messages from the organs of sense—the eye, ear, nose, and tongue—to the brain. Spread out over the face like a delicate network each little nerve-thread has its particular office. Some to carry to the mind the sense of the tiny pictures reflected on the back of the eye; some to take to the mind (or the brain) the sense of the vibrations in the air which have struck the drum of the ear; others to give to the mind a knowledge of the odorous particles which have been floated on the air into the nose which cause the sense of smell; and others to convey the taste of what has come in contact with the nerves of the tongue and palate in eating different substances, giving certain sensations to the mind, as sugar of sweetness, salt of saltness, vinegar of sourness, and so on.

And this is nearly all that can be told of the way in which the mind within the body gains a knowledge of what is without us, and it would seem as if it would be impossible for us ever to know very much more about all the wonderful powers and capacities of the human mind. Many animals have brains, nerves, and organs *of sense* somewhat resembling ours, and these help them *to live.* The sheep sees the tufts of grass that he nibbles for his food, the birds see the insects and worms that they feed on, and other animals smell out their prey and can hear themselves called to be fed ; but their senses do not bring them the lasting impressions which those of human beings give to the mind, and they have very little of the power of THOUGHT, which is the greatest power and privilege of man. It is this which raises man so much above animals. We can think, remember, fancy, and reflect. We can admire what is beautiful that our eyes see, and take delight in what we hear. We can gain knowledge by reading, and listening to the instructions of others. We can get into our minds some of the wisdom that was in the minds of the very wise who have lived on earth—such wisdom as must have been intended by God to come from Him through the minds of some particularly good and holy men to the minds of all human creatures. We can think about ourselves—about the wonderful construction of our bodies, and about the still more wonderful nature of our minds—and our minds are just able to form thoughts or conceptions of God, and to perceive that He must be of the same nature as our own minds, only very much greater in power, very much more knowing, very much wiser, greater and more good, than any man could possibly be. It is quite impossible for the human mind fully to feel and understand the greatness of God.

CHAPTER X.

DAY AND NIGHT.

Our lives are made up of days and nights—days of light and nights of darkness; each night coming on with the half light which we call twilight, and the brightness of day coming on with what we call the dawn. We all feel too well to need any reminding or teaching the great blessing which the light of day is to us. We cannot imagine our lives without it. We pity those whose business it is to work down in mines, where they are in darkness during the hours of daylight, and we feel that any manner of life must be preferable. Light is so great a blessing, that we do not always remember that darkness is also a blessing. We need rest and sleep, after all the business and pleasure of our days; and it is good for our minds, and for the right action of all our powers, that we should have these times when darkness comes on, and sleep overtakes us, and we see, and hear, and think no longer. With most people rather more than one-third of their lives is passed in sleep, so that a man who is thirty years old has passed as much or more than ten years in sleep, because out of each twenty-four hours he has slept as much or more than eight hours. And this quantity of sleep must be good for us, since it has been so ordered by the wise and beneficent Creator of us and all things. And our having the darkness, during which time we take the sleep, is brought about by the very manner in which all things have been created and ordered. The great globe on which we live, and the far distant sun, have to do with it in their relations to each other. Thousands of years ago, people who saw the sun seem to rise up in the east every morning, and sink down in the west every evening, thought that it moved over us during the time of our day, while the earth stood still. They made a great many clever and correct observations on the sun, moon and stars, and in the poems and other writings which have come down to us from the Greeks and Romans who lived thousands of years ago, there are very many allusions to the heavenly bodies, all of which show that they had no other idea but that the sun travelled over the flat earth every day, and sank down in the west, and then *somehow* came up again in the east every morning. It was a very natural mistake for them to make, because it seems as if this were the case; and if we were to trust only to the sense of sight, we should still go on saying that it must be so. The senses, however, often deceive us, if we do not exercise the thinking power of our minds. When riding along a road in a carriage we seem to see the trees and objects by the roadside moving in the contrary direction to ourselves; but we *think* about it, and know that it cannot be really so. This is exactly the mistake made by the people in olden times, who observed the apparent or *seeming* motion of the sun; and it was long before the truth was found to be that it is the earth itself which moves and not the sun.

By patient watching and by careful observations this was discovered. It was found, too, that the earth on which we live is not a flat surface, but a great ball or sphere; and that the apparent motion of the sun —its rising in the east and setting in the west—was occasioned by the spinning round once in twenty-four hours of this great ball-shaped world; and that this turning being from west to east makes it seem as if the sun travelled in the opposite direction. The astronomer Copernicus, about 350 years ago, was the first to discover this, and all the observations of all the astronomers ever since his time, and all manner of careful calculations, have helped to prove it true. The discovery has made clear to us all about the changes from day to night and from light to darkness which we have.

When that part of the earth on which we live is turned towards the sun, so that its light is poured upon us, we call it day; when we are turned away from the sun it is our night. When from the part of the earth where we happen to be we first begin each day to see the sun as we turn towards it, we call it the dawn, or sun-rise; and then it *seems* as if the sun were beginning to rise up in the east, while it is really our part of the earth being turned eastward towards the sun, and as we see more and more of it, it is as if the sun rose higher and higher. When exactly under or opposite to the sun we call it noon, or mid-day; and then as we go on turning we gradually lose sight of it through the afternoon, and the sun seems to sink down, until in the evening it is at last quite hid and has *disappeared,* and darkness gradually creeps on. If we *are standing* on a hill when we observe this, it seems as if the sun in the west sank down between the land and the sky; and if we are looking over the sea at sun-set, the bright, round sun seems to dip down into the sea.

It is as well for every young person to think of this explanation of what really happens while observing sun-set or sun-rise. It is a *truth* that the earth moves and not the sun, and it is better to know and understand what is true about such things, because we are sure to gain a better understanding of how wisely and mercifully all is ordered by God. We go on saying "the sun rises" and "the sun sets"—we talk of the "path of the sun," and of its "daily course," and do not care to suit our words to the real facts, excepting when we want to show by what a beautiful and simple arrangement we get the change from light to darkness and darkness to light. The sun is a very much larger body than the earth, and it is many millions of miles distant from us. As com*pared to the size of* an orange, which we will suppose to represent the sun, our earth would not be larger than a pea. We see, then, how much more fitly and simply it is arranged that by the spinning round (or revolving) of the small body, each part of its surface receives light in turn, and all the inhabitants of the earth gain the blessing of light and heat from the sun, and the refreshing change of light to darkness. To those who live in the parts of the earth where the sun's rays fall directly upon them all the year round, this change is a still greater boon than it is to us; the cool nights of tropical countries enabling the people to bear the great heat of the day, while they give the earth time to cool.

And everywhere all living things and creatures seem to require the change. When the sun is gone and darkness comes on, almost all animals retire to their lairs and nests, while some few choose this opportunity to go in search of prey; flowers fold themselves up, and the gentle dews fall, which are so refreshing to all vegetable life in the hot season. Then, too, when the brighter light of the sun is gone, we get either the softer light of the moon, or are able to see the countless stars which are scattered over the heavens; and when we are told that these stars are likewise suns, still more distant than the one which gives light and heat to our globe, our minds can scarcely conceive of the vastness of the universe and the greatness of God. We feel like the Hebrew writer of the Psalm, when he says, "such knowledge is too wonderful for me, it is high, I cannot attain to it."

CHAPTER XI.

THE SEASONS.

In our last lesson we showed how the changes of day and night were caused by the turning round of the great ball-shaped world on which we live—one half always in light and the other in shade; and now we will show how another of its motions gives us other changes. We have taught that the sun does not go round the earth as it seems to do when we observe the rising and setting of the sun; and we have also to teach that what happens is just the reverse, and that *the earth goes round the sun.* While it spins round, making our days and nights, it is also travelling round the sun, and this last movement is what makes our year, and gives us the changes of spring, summer, autumn and winter. We know that a year is composed of 365 days, and this is because it takes the earth that number of turnings round (or revolutions) before it has performed the journey round the sun. We have thus 365 days in the year and 365 nights, each day and night being divided by us into twenty-four hours. Everybody knows—even a young child, who has only lived eight or nine years in the world, has perhaps observed that our days all through the year are not of the same length—but that in summer we have long *days of light and short* nights of darkness, and that in winter we have short days of light and long nights of darkness, while they may also have observed that our nights and days in spring and autumn are more nearly equal.

Now as we divide the time the earth takes in turning round once into twenty-four hours—(we do this for the convenience of measuring our time, but there is nothing in nature that marks out hours)—it follows that, however long the day is, the night which succeeds it must be as long as makes up the number of hours to twenty-four. So when a day in summer is sixteen hours long, then the night can be only eight hours long; and when a day in winter is only eight hours long, the night will be sixteen hours long, because 16 + 8 make 24. This is nearly the greatest difference there ever is in the length of our days and nights in England, and just twice a year in spring and autumn the days and nights are each exactly twelve hours long. After our shortest day in the middle of winter, the days keep increasing in length till we come to the longest day in summer, and after this day they keep shortening till the shortest day in winter.

These changes in the length of day and night come from the manner in which the light of the sun falls at certain times, during the world's journey round it, on particular parts of the earth's surface. At one time in its journey the northern parts of the earth get the sun's rays more fully upon them, and for a longer time than at another. In another part of its course the southern portions of the earth get most of the sun's light and warmth. When the northern half of the earth is turned towards the sun, so as to receive this increase of light and warmth, it is our summer in England; and when the earth is turned so that the northern half of the globe gets less light and warmth, it is our winter.* When it is winter with us, it is summer in Australia, and when it is winter there, it is our summer-time. Only just round the middle of the earth it is hot all the year round, and the days and nights do not alter much in length.

The way in which light and warmth are thus unequally spread over different parts of the earth causes many of the differences which are to be found in the races of men and women who inhabit the different countries, and the way in which light and heat are given to us in different degrees or quantities at different times of the year, makes our seasons, and all the changes in our manner of life as we pass through the year. In the parts of the world which we call the Tropics, where the sun's rays always fall very directly down upon the earth, the countries are very hot, the islands of their sunny seas abounding in vegetation to their very shores—and the ripe fruit hanging on the trees the whole year round, while the inhabitants are brown-skinned as the Asiatics, or quite black as the Negroes of Africa. Scorching hot is it especially in the vast sandy plains which we call deserts, where there are only at great distances apart small patches of verdure, like islands in the widespread glistening sea of sand—the vegetation being caused by some spring or pool of water. Such sandy deserts can be traversed only by help of the camel and dromedary, whose natures have been suited to the heat and drought. In tropical countries the houses and buildings are contrived so as to keep out the heat, and the manner of life among them is arranged so as to secure all the shade and coolness possible. The foliage of the trees, such as the large-leafed plantains and fanshaped palms, seems intended to give shade and shelter from the scorching sun, while the abundance of juicy fruits supplies a never-failing means of refreshment to the inhabitants, and the quickness with which crops of rice and maize spring up saves them from hard *labour.*

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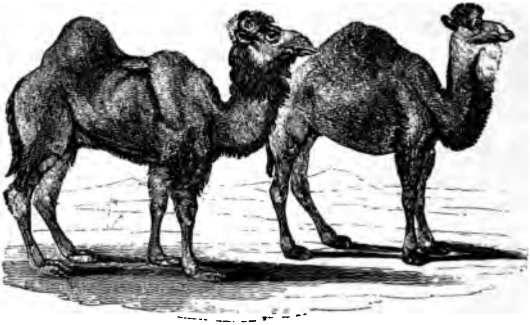
* The explanation of the changes of seasons is confined to this statement, since it is impossible without some kind of simple apparatus to make evident how the inclination of the earth's axis to the plane of its orbit occasions the variations. A teacher, however, can easily, with the help of a lamp or candle and a small globe or ball, show how, by the inclination of the axis of the earth, as it revolves on itself, and journeys round the sun, it is now inclined towards the sun (as in our summer), and now inclined *from it* (as in our winter), while the same amount *of light and heat is* received at the equator all the year round.



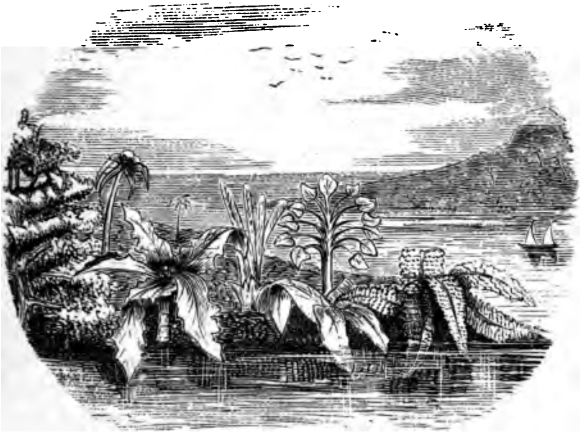
In what are called the temperate climates of the earth, such as we have in England, the changes of the seasons are, on the whole, however, much more favourable to human life. Unoppressed for any long period by excessive heat, men are able to bring to perfection many arts and manufactures, and the human mind is generally more strong and vigorous. Almost all the great discoveries and inventions which make life more full of knowledge and pleasure and comfort have been made by the inhabitants of temperate climates. We do more, and think more, and go about more, than if we were constantly oppressed by heat, or obliged to spend half our time in keeping out the cold.

Very great, too, are all the joys and advantages which come to our lives from the changes in our seasons. Each year we have to rejoice in the coming of spring, when every heart feels quickened with pleasure at the sight of returning verdure and the bursting into leaf of trees and shrubs, and springing up of plants and opening of flowers. Then, summer comes, with still more flowers filling our gardens and scenting the warm air, and fruits are ripe, which refresh us with their mingling of sweet and acid tastes and delicate flavours; when the corn ripens in our fields, promising us a future supply of bread, and birds and insects are on the wing busy in the search for their food, and the cows in the pastures and sheep on the the hill-sides feed in quiet content through the long sunny day, and every living thing seems to rejoice in the bright skies and soft winds.

And as summer passes into autumn other pleasures come upon us. The harvests of corn, wheat, barley, and oats are gathered in. The fruits of the trees in our garkens and orchards ripen, and the rosy apples, yellow pears, and juicy plums find their way from the country to the shops of towns and cities. In the south of England comes the harvest of hops, which help to make our beer; and in the warmer countries of Europe—such as France, and Italy, and Spain—comes the vintage, when the grapes are gathered and pressed, and wine is made. The very change in the foliage of our trees in autumn, when the life of the leaves begins to be spent, and the greenness changes to yellow, and red, and brown, making the country all beautiful to see, is a yearly pleasure; while as the leaves fall to the ground we know that they enrich the soil, and leave life in the trees ready for the buds of the next year.

Which of us, too, when all these sights and pleasures are over, does not look forward to many of the enjoyments of our winters—when we value home so much, and are drawn so much nearer to one another, and have comforts which help us to bear the cold, and pleasures which the very cold brings to many of us, provided for us by others, or which we can bestow on others. And if winter is trying to some of us, and makes us ill and suffering, we know, as certainly as we know anything, that spring will come again, and is nearer to us each time that our earth spins round: each day after midwinter becoming longer, and each night shorter, and more and more of the sun's warmth coming back again to gladden our hearts and quicken all things into life.

And all these changes, and a thousand more blessings than we can number, come to us from the way in which the earth obeys the laws of the Creator, which cause it to spin round or revolve and journey onward round the sun in a ceaseless, never-varying course—the unceasing and unvarying course bringing us at the same time all manner of changes which are good for our bodies and our minds.



TROPICAL VEGETATION.

CHAPTER XII.

SUBSTANCES AND OBJECTS.

MUCH of the comfort and pleasure of our lives arise from things which do not come as if *direct* from God, but are made by human beings themselves—such as houses to live in, and clothes to cover them; the furniture in our houses, such as tables, chairs, and beds; the books we read; the carriages we ride in; the boats and ships that we go on the water in, and all the useful articles that are sold in shops. All these things do not come direct from God; but He has given to men the powers by which they can make them, and the materials by which they are made. All the objects that surround us in life may be sorted into two large divisions or classes—NATURAL OBJECTS and ARTIFICIAL OBJECTS. An egg is a natural object, so is an apple, a flower, a shell, a tree. Books, knives, shoes, watches, are artificial objects made by men and women by means of the powers and out of the materials which God has given to them. Natural objects are so called because they are found ready made by nature. Artificial objects are so called because they are produced by the art of men. A material or substance can also be natural or artificial—as, for instance, leather is a natural substance, while paper is an artificial *substance.* Wood is a natural substance, glass an artificial substance, and has to be made or manufactured by art. Then again all the materials or substances out of which things are made can be divided into three great divisions—ANIMAL SUBSTANCES, VEGETABLE SUBSTANCES, and MINERAL SUBSTANCES. An animal substance has once been part of an animal, such as bone, leather, wool, horn, &c. A vegetable substance is something that has once been part of a tree or plant, such as wood, cotton, straw, cork, &c. A mineral substance is something that has been dug out of the earth and formed part of its crust, such as iron, gold, stone, marble, &c. Out of these three kinds of natural substances every artificial object or material is made. All the useful, convenient, and beautiful objects that our eyes can rest on, men's hands, helped by their eyes, and guided by their minds, have made. We take possession of and apply to the satisfying of our desires and wants all these substances and objects that we find in nature, and we go on making more and more useful things from year to year, and also go on discovering useful substances in nature and turning them to account, in order to increase the comfort and pleasure of our lives.

Let us consider, for instance, how certain qualities in certain substances have been first observed and then turned to account by man to supply his wants. We are told that the earliest inhabitants of England, when mere savages, dwelt in caves, and clothed themselves in the skins of wild beasts; but the day must have come when, observing the flexibility of the boughs of certain trees—the boughs of the oziers, perhaps, which grew in the swamps—they conceived the idea of bending them and interlacing them so as to form wattles, which they supported on upright branches of trees which would not bend, and thus they obtained the covering of a roof; while also noticing the tenacity and stickiness of clay soil while wet, and its hardness and imperviousness to wet when dried in the sun, they plastered it over their roofs to keep out the rain. It took centuries, perhaps, before they improved upon this idea sufficiently as to have walls to their houses of burnt clay bricks, and tiles of burnt clay for their roofs.

Then again the day would come when the very early inhabitants of Britain must have found that the stalks of certain plants—the flax and hemp especially—and the wool of sheep, could, owing to their flexibility, be first twisted into threads and then woven together, so as to make materials for clothing softer and warmer and more agreeable to wear than the stiff and heavy skins. By dint of observing how *best* to do this—how wool could be combed out more and more finely, and then twisted into finer and finer threads, and woven into finer and finer cloth, and then how this cloth could be dyed and dressed and rendered more and more glossy and smooth—the manufacture of woollen cloths arrived in the course of centuries to the perfection it has attained in our day, many of the methods employed having been copied, perhaps, from the people of Flanders, who, four or five centuries ago, also brought to great perfection the making of cloth.

In the same way with the fibrous stalks of flax and hemp. By industry and perseverance, as the years *rolled on,* and as Romans, Saxons, Danes, and Normans *had by turns* possession of England, the people must have gone on gradually improving their methods of beating out the fibrous stalks of the flax and hemp plants, and spinning them into glossy threads, and then bleaching them and weaving them, until they produced the fine linen fabrics for which Scotland and Ireland are now so famous—all this being at first done with the fingers and hands, slowly and with patient labour, until now it is all done so swiftly, and the fabrics produced in such vast quantities by the help of machinery. And so it has been with thousands of other natural substances.

We can many of us remember how even in our own childhood the substance called India-rubber, or Caoutchouc, was used only in little pieces to rub out pencil marks with, and we were told that it was the hardened juice of a Tropical plant, which, after being dried, became tough and elastic, and impervious to water. It must have occurred to some ingenious person that this latter quality (that of not allowing water to pass through it) as well as its elasticity, would make it useful for shoes and other articles of clothing, for tubing and bandages, &c., and now we know how very many are the purposes to which this substance is applied, so that vast quantities of the dried juice of the Caoutchouc tree, and other trees whose sap has the same qualities, are imported into England to be manufactured into useful articles.

And thus it has been with very many other substances of still more importance to our lives. We have turned to account all the animal and vegetable and mineral substances produced naturally in England, and we gather around us from the most distant parts of the globe all the productions of other countries, which are peculiar to their soils and climates—some particular quality in each making them valuable to us. We adapt them to certain uses on account of those qualities, in order to promote the comfort or pleasure of our lives, and we are ever employing our own powers of mind—are ever learning and inventing, and improving, and making discoveries—turning the qualities of natural objects to new purposes, finding out hidden qualities in them, and even discovering new substances and objects and materials every year—all which keeps the minds of men active and enquiring, and makes them busy and industrious; and we cannot doubt that this has been intended by the great Creator to come about, and that while the beast is by nature clothed with his skin or fur, and the bird with its feathers, and the food of each placed within its reach, the wants of human beings were left to be supplied by the exercise of their minds, and the whole of Nature placed under their control.

CHAPTER XIII.

FOOD AND DIGESTION.

In one of the first lessons in this little book (Chapter III.), we taught that our lives could only be kept up and continued by means of eating food and breathing air. Let us now see what becomes of the food we eat, and how it helps to nourish our bodies, and why it is that air is so necessary to the continuance of life. Food merely put into our stomachs would do nothing towards nourishing us, unless it underwent changes in the body. It would no more help to keep us alive than if put into a bag outside the body. In order to help in the building up of the body, and the support of life, part of it must be changed into blood, and the process or means by which this is effected is called digestion. If we eat substances which will not digest and undergo this change, it is the same as if we took no food at all—because they never become changed into blood.

Let us now see what are these changes that food undergoes during what we call digestion. The first part of the operation, and the one we have most to do with ourselves, is that which is called mastication or chewing, and for this we have teeth which are exactly suited for the purpose. An infant is born into the world without teeth because its food requires no mastication, and when it begins to grow it is a sign that more solid food is required for the nourishment of its body. When all the teeth have pierced through the gums and grown to their full size, they are just what are wanted—those in front for biting, and the back teeth for grinding and reducing to a soft mass the food in our mouths, so as to enable it to pass down the throat smoothly and easily. In order to do this still better our mouths are supplied with saliva or spittle, which mixes with the food as we chew it, and the tongue helps us to toss it about, so as to bring it to where the teeth can grind and mash it. As we chew our food we taste it by means of little nerves in the tongue and the roof of the mouth, and the nice taste of what we eat brings the saliva into our mouths by means of which it is softened.

When the mouthful is thus made into a fit state for swallowing, it passes down a passage called the gullet into the stomach, which is like an oblong bag lying across the body. Here the food undergoes more movement, and is tossed to and fro until it is churned into a still finer pulp, while a liquid called the gastric juice is mixed with it, which dissolves it more completely. Passing downward out of the right end of the stomach, the pulpy substance, made up of all the animal and vegetable matters that we eat, undergoes still further changes. It receives into it the bile, a liquid which flows from the liver, and then enters the long tube or passage called the intestine. In grown-up people this tube or passage is as much as thirty feet long; but it is so bent and wound about that it is packed into a comparatively small space in the lowest part of the body, and forms what is generally called the bowels. It is during its passage through part of this winding intestine that some of the digested matter is taken up by numerous veins, and, becoming blood, is conveyed to the heart, while such portions of the digested mass as cannot be converted into blood are passed on to be carried out of the body.

We have now to see what becomes of the blood after being poured into the heart-reservoir, and we find that it has yet another process to go through before it can nourish the body, and we learn why the act of breathing is so necessary to life. The blood which has been brewed out of our food has to come in contact with the air that we draw in to our lungs as we breathe, and this it is which gives it its life-giving power. Air is made up of two other airs or gases, oxygen and hydrogen. Every time that we breathe we give some oxygen to the blood, which comes in contact with it in the lungs, and then, returning to the heart (to another part of it), it is pumped out and sent through what are called the arteries to every part of the body. All the substances which make up our bodies are fed by it. It helps to add matter to each part: to flesh, muscle, fat, skin, and even our bones, and nails, and hair. If the body were not so added to or fed by the arteries it would waste away, and when the food and air do not give the right qualities to the blood, we become thin and ill, and have diseases, and perhaps die.

To understand thoroughly how all this comes about it is necessary not only to see drawings of the different parts of the inside of our bodies, but even to see the inside of the bodies of some animals after they are dead, for the insides of most quadrupeds and birds are very like our own. The better we understand the uses of each part, the more fully do we perceive how "fearfully" as well as "wonderfully" we are made, and with what fitness each *organ*, such as the heart, the lungs, the liver, &c., is suited to perform the action required, and the accuracy with which it works. People who are ignorant of all this may shudder and turn away with disgust at the sight of a dead body laid open to view; but others, who have been taught the uses of each part, and who understand how they act in order to continue life, are more likely to feel a thrill of grateful admiration at the sight, because they have attained to a better and higher sense of the greatness and goodness of the Giver of Life.

And before we finish our lesson—which after all can only teach a very small part of the knowledge which has been gained by those who carefully study the structure of our bodies—after learning how and why food is so necessary to us, let us remind ourselves what it is that urges us to give our bodies a constant supply of it. We never forget to do so, because directly food is needed we begin to feel hunger. A little of this feeling, which we all of us know so well, makes what is called our appetite, and we enjoy our food all the more for having felt it; but if it should happen that we cannot get food, or that it is withheld from us, the sensation of hunger becomes one of the most terrible and distressing sensations the body can have. And we see why the great Creator has made it so. It was necessary that both animals and human beings should be impelled by the *painful craving* of hunger to seek for food, and each animal finds it in nature, and near at hand; but human beings have to use the faculties of their minds in order to procure it. Hunger rouses them to exertion. It makes men industrious. It leads them to find means of procuring food, and urges them to invent and discover ways of increasing the quantity of it. This feeling of hunger is, in fact, one of the most striking proofs that we can possibly find of the good which arises out of what, for a time, is a seeming evil, and it shows us very plainly the far-seeing wisdom and benevolence with which all that concerns our life has been designed and arranged by God.

CHAPTER XIV.

AIR AND BREATHING (OR RESPIRATION).

We have shown in the previous chapter how, besides food, it is necessary that we should also take in air for the due nourishment of our bodies, and so needed is it for life that, at all times and seasons, and at every moment of our lives, are we drawing it in, and were we to leave off feeding ourselves in this way for one quarter of an hour we should certainly die. It is well for us that our thus taking in air or *breathing* is an action that constantly goes on without our having to attend to it ourselves, or think about it. Wherever we are, and whatever we are doing, and however occupied our thoughts may be, our breathing goes steadily on, and the breathing of a new-born infant is quite as certainly and regularly done as that of a grown-up person. It goes on mechanically, or like a machine, and without the exercise of our will. We can hold our breath and prevent the air entering our mouths or nostrils; but it is so painful to do so for any length of time that we soon let it enter again. Entering by our mouths and nostrils, the air we breathe in, or *inhale*, passes down a passage in the throat called the windpipe, and goes to fill the lungs, which are on each side of the chest and *are not* unlike two sponges, being full of small cells, *which contain* the air.

In our last chapter we told how the blood came in contact with the air in our lungs by means of small veins, and these veins are in connection with the tiny air-cells of the lungs. That part of the air which is called oxygen is by this means mixed with the blood, and as we breathe out, or *exhale*, another gas called carbonic acid gas, is given out and mixes with the air outside our bodies. Now, carbonic acid gas is a very unhealthy air to breathe, and this is why a number of persons sitting in a room which is not well ventilated make the air unwholesome by their breathing, and not fit for supporting life. People who sit much in small close rooms, and do not open the window or door to let in fresh air, become pale and unhealthy and lose their strength and vigour. We must have air to breathe which has the right quantity of oxygen in it; and as the proportion of oxygen to nitrogen (the other gas of which air is composed) is only one-fifth, it follows that we soon use up the oxygen in a room, unless the outer air is allowed to come in. A dreadful story is told of the captain of a ship being so ignorant of this fact that, when at sea and a storm came on, he ordered all his passengers to go down into a small cabin, and when there closed the hatches, through which alone air could be admitted to them. The storm raged on and prevented the captain and the sailors from hearing the cries of the passengers who, for want of air, were suffocating; and when at last the cabin was opened it was found that, out of 200 passengers, 72 were dead—poisoned by the corrupted air.

Nothing is more important to us than this knowledge about the composition of air and the necessity there is for letting pure air get to our lungs. Those who have to work in close rooms or factories where many people are breathing and spoiling the air, are very often pale and unhealthy. The burning of candles and gas also makes air unfit to be breathed; because they burn up the oxygen of the air, and, in doing so, give out carbonic acid gas. If we put a lighted candle under a glass vessel, the candle will gradually burn dimmer and dimmer until it has used up all the oxygen, and then it will go out. The vessel will then be found only to contain nitrogen and carbonic acid gas.

All animals require oxygen to breathe as well as ourselves. Through their gills, which serve the same purpose as our lungs, fish breathe in the oxygen which is in water, and some of them come to the surface of the water they live in to get it from the atmosphere. It will thus be seen that a vast quantity of oxygen is constantly being taken from the air and used up by human beings and animals, while we also burn up an immense deal with our gas lamps and our fires. How, then, is the loss of it supplied? Simply by the fact that all plants breathe out oxygen at the same time that they use up the carbonic acid gas which animals and human beings exhale. The leaves of plants act the same part as the lungs of animals and human beings, except that they take from the air that which the latter do not want, and give them in exchange fresh oxygen.

Can any one learn all this for the first time without being struck by the proof it gives of how wisely and *beneficently* everything in nature has been arranged *and brought* about? We see by it how animal life and vegetable life are made to balance each other. The vast forests and prairies, the meadows, the cornfields, and gardens—all the plant-life of our great globe subsists on the carbonic acid which is given out in the breathing of men and animals. They absorb it from the air, and it goes to form their substance, and they give out in return the oxygen wanted for animal life. Plants and animals thus depend on each other. But even were the oxygen wanted for breathing not added to the atmosphere in this way, it would not be possible to exhaust all that is in the air surrounding the globe, so vast is its quantity. The atmosphere extends as much as forty-five miles in depth or thickness around the great ball of the earth. It is like a soft transparent coating surrounding it everywhere. It accompanies it as it rolls smoothly on around the sun. It is transparent, and lets the light and the heat from the sun pass through it. Only under certain circumstances does it refract or bend out of their course the rays of the sun, as when the sun is first seen by us in the morning, or when we last see it in the evening, at which times the air breaks up the light into lovely tints of yellow, orange, and red.

The breathing in of pure fresh air is a great pleasure to us all, and we get it best when out of doors away from close rooms and crowded streets and buildings. It enables our lungs to act freely; it sends the blood from our hearts to every part of our bodies of the right kind and quantity; it causes our livers to give out (or secrete) properly the bile that helps to make blood. All health and freedom from unpleasant feelings and thoughts is secured in a great measure by plenty of fresh air. Our brains require it, and our minds ar more vigorous and active when all the other organs the body are performing their parts rightly through th admission of fresh and pure air to the lungs. Air is t us all most truly the Breath of Life.

END OF PART I.

THE GIFT OF LIFE.

Part Second.

CHAPTER I.

WATER AND ITS WAYS.

THERE is nothing that shows to us more plainly the loving purpose of God in adapting our natures to the earth on which we dwell, than the manner in which water is supplied for the support of life. After animal and vegetable food and air, perhaps, nothing is more necessary to our lives than water. That it is needed for the health of our bodies we know from the feeling of thirst, which can become quite as terrible a sensation as extreme hunger. Shipwrecked sailors, exposed in boats for days together before they reach land, or cast on rocky islands where there are no springs, and where the climate is such that rain only falls at certain seasons of the year—they know only *too well the agony* which may be suffered for want of fresh water. Travellers in the burning sandy deserts of Asia and Africa, whose store of water in the leathern bottles or skins which they carry with them is exhausted, and with a burning sun overhead, will languish and faint, and even die, if they cannot succeed in finding an *oasis*, or little patch of fertile land, where there is a spring in the midst, which causes the growth of trees and plants. Failing to find such a spot, they will even kill the camels, which are so precious to them, in order to get the water remaining in their stomachs. Nearly all creatures, and all plants, require water for the support of their lives. Human beings require it also for the cleanliness of their bodies, and of all that surrounds them, and that they use. It is necessary for health to keep open the pores of the skin by washing, and it is a pleasant as well as a healthy thing to bathe. We require water for cooking our food, and for a thousand manufactures and arts, and sadly should we suffer did not the fertilising rain fall on our fields and gardens when seeds have to germinate and the corn and plants spring up which are needed for our support. And, crowded as we live in our great towns, it helps to keep away disease, and purifies the air, and carries away the noxious substances which accumulate when heavy rain falls and floods the streets.

And where does all rain, river, and spring water come from? As we look at a globe, or map of the whole world, we see that there is a much larger part of its surface covered by water than by land, and we all know that the sea is very deep. But the water of the sea cannot be used to quench our thirst on account of its saltness; the first thing a captain does when he prepares for a voyage is to put fresh water on board—and the shipwrecked sailor, though water is around him on every side, knows that it would be death to drink of it; nor can the water of the sea be of any use in making the ground fertile, for it would destroy the life of all vegetables except those constituted particularly for living in it, such as seaweeds. And yet when we have to give the history of all the water that is used by man, and that fertilises the earth, we must begin by saying that it comes in the first instance from the great briny ocean, which covers so large a portion of our globe.

Pilota Plumosa, a very common sea-weed on our shores.

In telling all that we have to say about water, we may, it is true, begin by saying that water, like air, is composed of two gases, and that one of these is the same oxygen gas on which, as we have seen, all animal life depends: the other gas is called hydrogen, and of this there is the largest proportion. Having told this, it is rather the *ways* of water that we have to describe —the different changes it undergoes, and the different *conditions or states* in which it is found. On mapglobes, or charts of the whole world, we can see that just where the line called the Equator divides the earth into two halves (called hemispheres, or half spheres—north and south) a large portion of the great Atlantic Sea on one side of the globe, and of the great Pacific Ocean on the other, is crossed by it; and it is just in those parts of the globe which lie on each side of the equator (called the Tropics) that the rays of the sun fall most directly all the year round, so that it is constantly hot there. Tropical countries are the hottest parts of the earth, and the oceans at the tropics have the hot rays of the sun constantly pouring down upon them. If we put a saucer of water in the sunshine in summer it will gradually diminish in quantity until it is quite dried up, or, in other words, has all passed up into the air; and if we put water on the fire we know that directly it becomes hot, vapour or steam rises up from it, and that if left there long enough it would all become turned into vapour, or be *evaporated.* In like manner, the hot sun upon the tropical seas causes a constant uprising of vapour—a drawing up of watery particles by the hot sun. This vapour is not salt—it leaves all the salt particles behind it. It rises up invisibly, for it is too finely dissolved by the heat to be seen in the air. It rises up and up, till it reaches a part of the atmosphere which is of its own weight. When the sun is away at night, it gets cold and condenses—the watery particles running closer together—and then it becomes visible, and we call it cloud. The clouds which we see high up above us are but masses of *floating* vapour, and we know how easily they are *wafted by* the wind, so that the cloud, or vapour, which thus rises up from the seas of the tropics is carried by currents of air, or wind, in every direction—north, south, east, and west.

Let us fancy what happens with clouds that come up from the tropics to colder parts of the globe. They there collect together and become more heavy, and the minute watery particles of vapour join together still closer and become water, and the water-drops, becoming too heavy for the air to support, fall upon the earth in the form of rain. If we hold a cold plate over hot water, the steam or vapour which rises from it will also, as it cools, run into drops upon the surface of the plate. This is what always happens when it rains, and sea water is thus turned into rain water. The water which falls on the land in rain is all that is wanted for vegetation; and by its falling in such drops, and not in heavy masses, the tender plants are not crushed and injured. But all the water which falls on the earth and sinks into the ground when the rain falls is not needed for vegetable life alone; it is wanted for the life of animals and human beings, and for them it is supplied in other forms.

Much of the rain which falls sinks deep down into the earth far beneath its surface, and much of it which falls on high mountains is frozen into snow, and rests on their tops, and forms glaciers, or beds of ice, among them. That which sinks so deep into the earth collects there, and, when filtered through gravel and other mineral substances, becomes clear and sparkling and agreeable to drink, and we call it spring water. It is the water we have in wells and draw up in buckets, *or pump up with pumps.*

Such collections of water, when in the centre of hills and mountains, often make their way out at their sides, and run down in streamlets, and the streamlets join together, and form little rivulets and brooks; as these too run down from higher to lower ground, they meet and mingle their waters until there is a stream wide enough and deep enough to be called a river.

Many great rivers also begin their course among the high snow-covered mountáins and glaciers of ice. They come at first from the melting of the snow and ice in summer. The heights from which they come, and the numbers of other streams which unite with them, make them soon quick-flowing, deep, and wide streams. When, in their course, they get hemmed in among hills or mountains, they spread out into lakes; but where the land around a lake is lower they escape and flow out, and continue their course to *the sea.*

And now we have shown how the same water is first salt sea-water, then cloud, and then rain—then springs, and then the water of rivers and lakes. Think of how all these different states of water are blessings to human beings! To how many purposes they serve. How we want the rain to fertilise the land, and the spring water to refresh us and quench our thirst. How we build towns and cities on the flowing rivers, and use them to bring up our merchandise from the sea; and, lastly, how we go from land to land upon the surface of the great oceans in our ships to fetch from other countries the commodities we want, and to take to them our own natural productions and our manufactures.

In all ages men have seen, in the blessing which water is to them, a proof of the loving-kindness of God; and the Hebrew poets who wrote the Psalms speak with grateful praise of how God "covereth the heavens with clouds and prepareth rain for the earth;" how He "sendeth the springs into the valleys which run among *the hills," and* "watereth the hills from his chambers, and causeth the grass to grow for the cattle, and herbs for the service of man." And, after recounting all these, and many other blessings, one of the writers ends with saying, "How manifold are thy works, O Lord! in wisdom hast thou made them all: the earth is full of thy riches. Bless thou the Lord, O my soul."

Sea-weed. Delesseria Sanguinea.

CHAPTER II.

LIGHT.

The light of day, as we have shown, comes from the sun. Though many millions of miles from us, the sun sends down such a flood of light on to the world that it prevents our seeing by day the light of the other heavenly bodies; and even if the sky be covered with clouds and we cannot see the sun itself, its light still reaches us more or less, penetrating the clouds as through a veil. Light is necessary to both animal and vegetable life as well as to human life. Few plants or living creatures can be healthy in the dark. A plant grown in the dark is sickly and pale coloured, if not quite white. All colour depends on the light of the sun; the green leaves of trees and grass—all the bright hues of flowers and insects, the plumage of birds, the soft colours reflected from pearls and mother-of-pearl, and the rich hues and sparkling flashes of colour which come from precious stones.

In describing the formation of the eye in a previous chapter, we showed how the light enters it at the black spot in the centre called the pupil, and falling on a nerve spread out at the back of the eye gives us the sense of sight and brings pictures, as it were, to the mind of all that surrounds us. The sun's *rays of light* are also mixed up with rays of heat, so that light and heat travel together from the far distant sun, and bring us life as well as beauty; for, as we have seen, warmth is necessary to life. The sun's rays also fall upon the moon as it travels round us once in every month, and the soft moonlight is the light of the sun reflected to us from the surface of the moon. That of the stars, which sparkle in the sky at night, are supposed to be very distant suns like our own, sending out their own light; while the stars we call planets, which shine with a steadier and softer light and change their places, are supposed to be worlds like ours, which are also lighted up by the rays of our sun, and have many of them moons revolving round them at the same time that, like the earth, they move round it.

The nature of light is not yet clearly known, so that we cannot teach what it is, but only point out what are its effects. We know that a single ray or line of light coming from the sun is made up of separate coloured rays —red, blue, and yellow—and that these, lapping over each other, or mingling together, make other colours, as violet, orange, and green. When seen through the drops of a chandelier, or a three-sided piece of glass called a *prism*, the coloured rays are separated, and we see all the colours of the rainbow. The rainbow itself is caused by a distant shower of rain breaking up the rays of the sun into all the different colours as it falls on the drops of water, each one of which acts like the glass prism. Light, as it falls upon different objects, is reflected or sent back, and then enters our eyes. Some substances reflect some rays, and absorb or take in others. When a substance or object reflects all the rays to our eyes, we call it white. When it absorbs them all, we call it black. When only blue rays are reflected, we see the thing or substance to be blue. When red rays are reflected, we see it red, and the thing which is yellow to us is that which has not taken in or absorbed the yellow rays. Blue and yellow rays mingled together and reflected make a thing seem green. Red and blue rays produce violet; red and yellow, orange. When the rays of the sun cannot pass through an object, such as a post, a wall, or a house, there is a shadow on the opposite side, because the rays are stopped in their course and cannot fall on that part of the ground. Darkness is only another name for the absence of light, and not a thing in itself. When the rays of light cannot pass through a substance or thing, we call it *opaque*. When they freely pass through a substance, such as water or glass, we call it *transparent.**

Now this transparency of glass makes it a most valuable substance to us and enables us to derive many advantages and blessings from light which we should otherwise not have. We can hardly imagine to ourselves the time when there was no such substance. We do not find it in nature, but have to make it. A story is told that the first discovery of how to produce glass arose from some sailors having made a fire of sea-weed on the seashore of Syria, and that the burnt ashes (which had become what we call potash or alkali) mingling with the sand produced lumps of glass. Some such origin of the discovery may well have occurred, and men would not be long in turning to account the useful transparent substance; but we must go back very far in the world's history for the invention of glass, since glass beads are found upon the mummies, or preserved bodies, taken from the ancient tombs of Egypt, which may have been worn as ornaments by the Egyptian princes and people of rank many thousands of years ago. Drinking vessels of glass have also been found which were used by the Assyrians, Greeks, and Romans; but these must have been very rare and costly, since only small quantities can have been made of the valuable substance.

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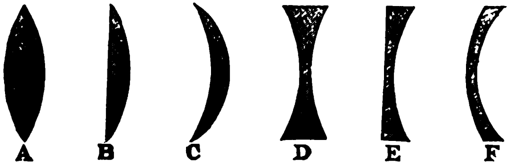
* *From the Latin* words for "*through*" and "to appear."

Many centuries must have passed over even after the knowledge was gained of how to make glass before it was used for windows, which, of all the purposes to which it is applied, is the most useful. In the reign of Alfred the Great the houses even of the rich had but small openings in the walls to admit the light, which, in order to keep out wind and rain, were provided with shutters. It is said that King Alfred invented lanthorns; but these were made of thin pieces of horn, through which the light can only have showed dimly. A great increase of comfort must have come to the people when glass was manufactured in small square pieces, which were set into frames of lead, such as we see in very old country houses, and it must have altered greatly their habits when they could live within their houses in winter time and yet have the light of day entering their rooms. By the time that the people of England began to build the grand churches and cathedrals which tell us in these days of the piety, taste, and skill of our ancestors, the manufacture of glass must have made still further progress, and means of colouring it discovered, so that patterns and pictures could be formed with it to fill in the traceried windows and let in to the beautiful and stately buildings a soft coloured light.

Still further on in the world's progress was made the discovery of how pieces of glass of a certain form could magnify so as to render visible to us very small objects, and also enable us to see plainly very distant ones, and the microscope and telescope* were invented, which have caused men to obtain a much greater knowledge of the wonders and beauties of creation. By means of round pieces of glass called *lenses*, some of which have a *convex* (or bulging) surface, and others whose surface is *concave* (or hollowed out), the rays of light, which pass through them, can be spread out or drawn together.†



A, B, C, are *convex* lenses, which collect the rays of light to a focus or point. D, E, F, are *concave* lenses, which disperse them.

In the human eye there is just such a lens as A, through which the rays of light reflected from all the objects about us are brought together, so as to fall on the outspread nerve at the back of the eye-ball called the *retina*, from which the sense of sight is taken to the mind; and it is by means of glass lenses put together in a certain manner in telescopes that we are able to see the heavenly bodies and to watch and measure their movements. We can see, with the help of the telescope, the moons which revolve round some of the planets, and the mountains and valleys and extinct volcanoes on the surface of our moon; while, by the magnifying power of lenses, we can also see exceedingly minute forms of animal life which are otherwise invisible to us. A single drop of water from a stagnant ditch or pond, when highly magnified, is often found to be full of living creatures, whose forms and natures are most wonderful and curious; and while the microscope thus helps us to understand how great an amount of animal life there is near to us in the world, the telescope reveals to us how the universe is filled with other worlds and other suns immeasurably distant from us, and helps us to con-

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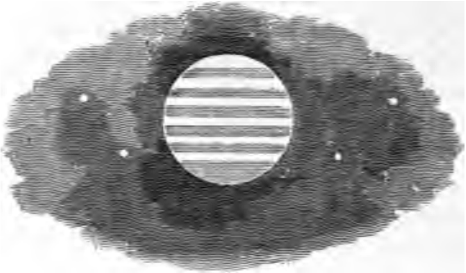
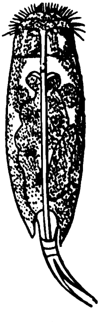
* These names are made up of Greek words, meaning "to see *the little*," *and* "*to see* the end or distance."

† *See Chapter on* Sight in Part I.



Jupiter and his Moons.



Rotifer-animalcule, *found in ponds and ditches.*

ceive of the vastness of creation, and to see the greatness of the power of God.

How astonishing is it when we consider that by means of two such easily obtained substances as potash and sand, when melted or *fused* together by heat, a substance can be produced which helps us to obtain this increase of knowledge, so that, while the transparency of glass allows of the passage of light, it also causes much of the light of knowledge to fall upon the human mind. We are accustomed to compare knowledge to light and ignorance to darkness. People who are ignorant are as if groping in the dark, while others who have much knowledge are like those who, walking in the light of day, see clearly all that is around them. "God is light," since He knows all things, "and in Him is no darkness at all."

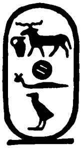
CHAPTER III.

SPEECH AND LANGUAGE.

ALL the many objects which surround us capable of giving us pleasure, and all the means we have of turning them to account, the senses of sight and hearing, and all the powers of our minds which enable us to discover and invent, would hardly be of use to us if we had not the means of exchanging our thoughts by means of speech, or, in other words, if we could not talk to each other. Speech makes a greater difference and distinction between us and animals than anything else. Animals cannot express their thoughts to each other, or teach each other, or join together to make or do anything as well as men for want of speech; and if there were such a thing as a country of dumb men and women, we are sure that it would remain very backward in all arts and in all knowledge. The pleasure of living, too, is very much greater to us through the power of speech. Each day of our lives our comfort and happiness depend upon words spoken to us, or which we speak to others. If we have wants which we cannot satisfy for ourselves, we must ask some one else to supply them. If we have pain or sorrow, it relieves us to tell some one of it. If we have joy or pleasure, we almost double it when we *are able to* tell of it, or describe it to others. We *scarcely* care to see beautiful things, or hear what is interesting or amusing, if we cannot speak of these things afterwards, and when a thought passes through our minds we like to express it in words to those who will understand it. All this is done by means of speech and language. But, first, we must have the voice, and this is the power we have of forcing air up from our lungs through our windpipe, and then of modulating and changing the sound it makes as it passes through our throat and mouth. When we breathe, the air passes into and out from our lungs without any effort of ours; but when we speak or call out, we force out a greater quantity of air, and, as it passes through the upper part of the windpipe, it strikes upon various pieces of gristle or *cartilage* which form the voice. So far we have the means of calling out, shouting, and even producing musical tones; but for speech the sound must pass through the mouth and undergo all the changes which are made by the tongue and the lips, and even the teeth and roof of the mouth are wanted. If we come to consider what speech is, we must describe it as a number of little sounds, which, put together, form words, and the words uttered in succession make the sentences which express our thoughts. These little sounds put together in different ways make up all the different languages spoken in the world. When, for instance, we want the sound of the letter *m* we must use our lips, for *l* we want our tongue, for *s* we must have our teeth, while others require very little motion of the mouth, like the vowels *a e i o* and *u*, and the sound of others, like *h* and *g*, can be made almost by the throat alone. All these sounds we utter in quick succession as we speak; each word made by them has a meaning, and when some single words are uttered which express a person, or thing, or quality, we have an idea directly brought into our minds. We think of the person, thing, or quality, as we hear the words. Savages contrive to get on with very few words; but as men get civilised and clever in arts, and begin to think more, their words multiply, and at last, among the cultivated peoples of the world, there are languages which will express everything they want, even the deepest feelings, and most subtle thoughts, and the most delicate fancies. With respect to the expression of feelings the human voice has the power of conveying much meaning through changes of *tone*. We give a different tone to our voices when we express thoughts or tell of something sad and sorrowful. We can express anger, surprise, regret, indignation, and contempt through the tones of our voice. When we talk of trivial and foolish things, our tone of voice is quite different to what it is when we speak on solemn and sacred subjects. As we name the name of a friend or companion it is in a different tone to that in which we utter the great name of God. We endeavour to speak only of Him in a tone of reverence.

But as words once spoken pass away and are not always remembered by those who hear them, men very soon had the desire to put their thoughts into some form that would last. Events happened which they wished to be known by those who lived after them, and when any one became greater and more honoured and loved than the rest of the people, they liked to put their *names* upon tombs, together with some account of their *deeds* and lives. Out of this desire came the invention of written letters, which were to represent the sounds of words. Perhaps some savages even began by cutting notches on sticks, which were to record certain events or the passing of time, and next made marks on soft clay, which hardened when it dried. By and by, when more civilised, they would take to carving marks and letters on stone. Many such marks and letters are found in different parts of the world, carved on the stones which once formed tombs and temples and the dwellings of kings thousands of years ago, and which in these days we try to decipher and understand in order to learn from them all we can of the people who wrote them. The Egyptians are said to have been the most ancient nation who had the art of writing among them; but the way in which they first recorded events was by means of pictures or figures of the thing meant. They then came to signs instead of pictures, and the signs were at last changed into letters. On the

Gateway to the courtyard of a temple at Karnac, in Egypt.*


The name of the king who built the largest of the Pyramids of Egypt.

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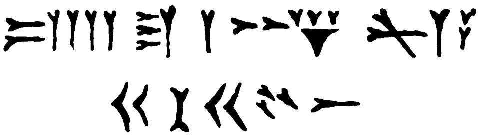
* This cut and the following are taken from Sharpe's "History of Egypt," a work which tells all that is known about this wonderful country, from which the other nations of the world learnt in past times so many arts, and derived so much knowledge and civilisation.

remains of the ancient tombs and temples of Egypt—which country was great and civilised, while the people of our island were still savages—there is much of such picture-writing, recording the names and exploits of their kings, which we call hieroglyphics; while on the remains of the palaces and temples of the Assyrians, a nation which became civilised after Egypt, there are found long histories of the lives and conquests of their kings, written in words made up of separate characters on the same plan as we write now. It is called arrow-headed writing, from the shape of the strokes which form the letters. On ruins found in Greece, which was, perhaps, the greatest nation of former times, other shaped letters are found, which are the same as those used in their books; while upon the ruins of Rome are just such letters as we use in the present day for capitals in print; and we also use them for numbers, and when we put on a building the date of the year it was built, as



ΑΓΝΩΣΤΩΙ ΘΕΩΙ.[*]

ANNO DOMINI MDCCCLXXI.

When men began to express all they thought, and to record all they did in writing, it led to their adding more and more words to their languages, in order that they might describe everything very exactly; and this again led to their adopting very often, words out of the languages of other nations; and we go on doing this even now when we find we have not the word we want in our own language. English is made up of many languages. The Romans, when in England, left us many words out of their language—the Latin. The Saxons gave us many more, and when the Normans conquered the land they gave us many French words.*

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[*] These words were found by the Apostle Paul, inscribed on *an altar* at Athens, and meant "To the unknown God."—See *Acts* xvii. 23.

No knowledge could have been handed down from one generation to another were it not for written language. Men and women who live in these days learn by reading, all about the events which happened thousands of years ago. If the history of them had not been written down we should never have been sure that they were remembered rightly. Especially has it been of great advantage to us that words which were spoken very long ago were written down after they were uttered—such as the words of Jesus Christ. All the lessons and precepts which He gave to the few disciples who gathered around Him as He went among the towns and villages of Galilee, Samaria, and Judea, and the words He spoke in the Temple Courts of Jerusalem—all these must have first been treasured up in the hearts and memories of those who heard them, and then afterwards written down in Hebrew, the language of the Jewish people; and lastly they came to be written in Greek, which for many centuries after Christ was the language spoken or understood by all the most civilised nations of Europe. To us they come in translations from the Greek.

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* The teacher can here point out how we retain the Saxon name for the living animals used for food, as ox, cow, sheep, calf, *&c., and the French* name for these animals, when dead, as beef, *mutton, veal, &c.*

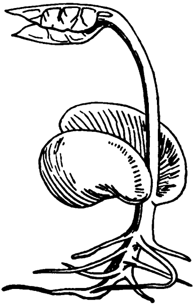
Speech, then, is needed by us to express our wants and feelings, and to give utterance to our thoughts; and written language is needed to record events which have happened, and to tell us of all that has been discovered, and to hand down to us such precepts and truths as make men wiser and better.

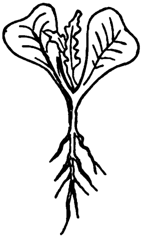
We may, for instance, believe that men know their duty towards their fellow-creatures better for the injunction of Christ, "As ye would that men should do to you, do ye also unto them likewise;" and that they are led to trust in the loving care of their great Creator from the assurance given by Christ, that not even a sparrow falls to the ground without our Heavenly Father's will.

CHAPTER IV.

VEGETABLE LIFE.

SINCE our life is dependent on the life which is in trees and plants, it is worth while to learn how vegetable life is supported, and how the parts of plants are built up—in other words, how they grow. All growth comes from the addition of fresh materials to the body which has life. We have seen how our food nourishes our bodies through digestion, and the circulation of our blood, and we shall find that plants are also fed in somewhat the same manner. The food of plants and trees is, first of all, the moisture which they suck up or *absorb* from the earth by means of their roots. The larger the tree or plant is, the farther the roots spread out underground, as if in search of its food, and this also helps to keep the tree firmly fixed in the ground and able to resist the wind. The roots of large trees spread out underground very like the branches which are above ground, their extreme ends being of a spongy nature so as to absorb the moisture left in the earth by the rain; while with the water there enters into the plant or tree a portion of the substances which form the soil in which it grows. This is the reason why certain soils suit certain plants and trees better than others, and a tree or plant will not flourish well where it cannot get from the soil the substance needful to its growth, in the same manner as we cannot live healthily and be well nourished by our food, if it has not in it the substances which our bodies require. Clever farmers and gardeners know well what kinds of soil their corn and plants must be sown and planted in, in order that they shall thrive; and though moisture is wanted, and they would die if rain did not fall, or if they were not watered, yet water alone will suffice for very few plants. When seed has been put into the earth and begins to germinate (or quicken into life) and grow, it sends down first a little root to suck up moisture and then pushes upward out of the soil a little green shoot, which is the future plant. Sometimes the seed, as with the bean, splits into two parts or lobes, which seem to contain a reservoir of nourishment for the young plant, and sometimes, as in the mustard, two fleshy leaves appear above ground first, which supply nourishment for a time to the young shoot. These parts are called *cotyledons*, and a very great *number* of plants are provided with them. After being *absorbed*, the moisture which is to feed the plant under-

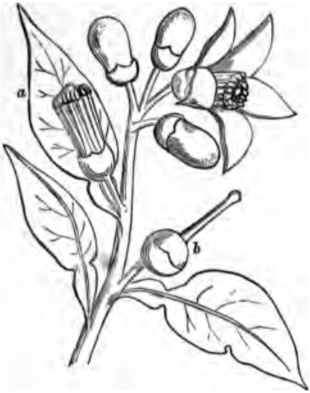




goes several changes as it passes up and forms the stem, the branches, and the leaves. It first becomes sap, and this it is which corresponds to blood in the bodies of animals and human beings. The sap passes up fine tubes and vessels in the stem and branches, and spreads out over the leaves by means of veins and small cells. It makes the woody part and the more flesh-like and tender parts of the plant as it goes. It builds them up, adding little by little of the right matter in the same way that our blood builds up our bones, and muscles, and flesh. This is plant-growth. Many different substances are also formed in the inside of plants, such as gums, sugar, starch, resins, and the richly flavoured juices of fruits and the delicate essences which make the perfume of flowers. All the wine that is drunk was first *brewed*, as it were, in the grape vine out of the sap, which was once nothing more than the moisture absorbed by the roots from the soil. The warmth of the sun had, to be sure, a great deal to do with sweetening it and giving to it its flavour. The *brewing* could not have gone on without that distant furnace which helped also to give green colour to the leaves and purple to the grape, as well as its sweetness and flavour.

Plants, like animals and human beings, also require air for their life and growth, or, rather, they want one of the gases which compose air. They want the *carbon* which is in carbonic acid gas—that very gas which, as we showed in a former chapter, animals and men do not want, and breathe out or exhale. Plants take *in* or absorb this carbon from the atmosphere, and they send out in return oxygen gas, or which all animal life (the life of animals and human beings) depends. The leaves of plants and trees act as lungs—they give out and take in these gases. They are the organs of respiration to plants, as our lungs are to us. If all the leaves are stripped off a plant it dies, because it cannot breathe in by any other part sufficient carbon, and cannot get rid of the oxygen it does not want.

Each plant is, however, made, not only to live and grow itself, but is fitted also to produce more life of the same kind. It has parts or organs which provide for this, so that, not only from year to year, but from thousands of years to thousands of years, the same plants and trees are found all over the world. The part of a plant which contains the provision and the means by which plants exactly like itself are produced is the flower or blossom. Just that part which gives us such pleasure to see, and which brings us so much beauty to our lives, is of the greatest use! Within the flower or blossom is the little germ, which becomes afterwards the fruit or seed of the plant. If it becomes a fruit it has still within its pulpy or juicy covering the seed of a future plant of the same kind. As this germ or *germen* swells and ripens, the flower leaflets fall off and are no longer wanted. Sometimes the seed is contained in a pod, like the pea and bean—sometimes in a hard shell, like the nut and walnut—sometimes surrounded with juicy pulp, like the apple, pear, and orange—the little pips of which are the seed, while the seeds of the corn plants are packed up in rows in the *husky* ear. Nothing is more wonderful than the way *in which* each little germ or germen, which is to be the future seed or fruit of the plant, is made fertile and ready to produce other plant life through certain little



The blossom of the Orange Tree, showing the corolla—pistil and stamens (*a*) and germen (*b*)—which becomes the fruit and contains the seed of the future plant.

parts or organs called *pistils* and *stamens* within what is called the *corolla*, or flower-cup. To those who observe and learn how all this is brought about, it becomes a striking and touching proof of how carefully the continuance of life is provided for by the Creator even among vegetables.

It would be almost impossible to enumerate all the service which trees and plants afford to men. It is not only the food we get from them that makes them so important to us. We turn them to account in thousands of ways. Let us think of how we employ the great timber trees of the forests for building our houses and our ships, and how we fetch from distant countries beautifully coloured woods, like mahogany and rosewood, for our furniture. How we have made one of the necessary things of our daily life the little dried and curled up leaf of a Chinese plant, which we call tea, and how, because it so refreshes us when infused in hot water, we send for it to the other side of the world, and keep millions of the inhabitants of China employed in gathering and preparing it for us. How, because we like the taste of the sugary sap of a cane that grows in the West Indies, we also send hundreds of ships every year to fetch it for us; and how the berry of the coffee plant of Ceylon and the West Indies has become one of the

Leaf and Blossom of Tea Plant.

Sugar Cane.

luxuries of our lives. Think how we get oil from the olive tree, resin and tar from the fir tree, and gum and many useful medicines from other trees. How we depend on the soft wool which grows in the pods of the cotton plant in America and India—how we spin it with our ingenious machinery and weave it into calico and muslin and all kinds of useful materials for clothing. Even the wonderful telegraph wires, which are laid down at the bottom of the sea to take our messages to the other side of the earth, are covered over to protect them from injury with the substance called gutta-percha, which is the hardened sap of a tree which grows in the tropics.

Flower and Berry of Coffee Plant.

Also, from its being the support of the life of animals, does vegetable life become very necessary to us. The flesh of the ox and the sheep, which forms such an important part of our food, has been produced by the vegetable food of these animals. Through the process of digestion, the grass of the field has been changed into the beef and mutton which we eat, and even the milk we drink may also be said to have once been grass. In this manner the mineral substances which *vegetables draw* out of the soil pass through them and the flesh of the animals we eat, into the composition of our own bodies. This is a most wonderful fact, and one that is almost too difficult for our minds to conceive; but it is because our lives depend on this curious transformation, that the earth brings forth so abundantly the grass which suits the digestive powers of animals, and the corn which is so nourishing to human beings. Just that which is needed for the natures of all creatures is, indeed, everywhere found to be mercifully supplied by our wise and loving Creator. "He causeth grass to grow for the cattle, and herb for the service of man, that he may bring forth food out of the earth."

CHAPTER V.

MINERAL SUBSTANCES.

After having seen how much our lives depend on vegetable and animal life, we must show also how much use we make of mineral substances, or those which make up the earth itself, or are found in it. We do not know much about the material of which is formed the bulk of the great globe, on the surface of which we live; we only know something about what we may call the outside *rind* or *crust* of it. As compared to a large orange we do not know more in proportion to the rest of the globe than just the outside yellow layer of the peel, and yet that outside crust of the earth yields to us innumerable substances which are of the greatest use to us, and which help to fill our lives with conveniences and means of providing ourselves with protection and comfort. Those who study the formation of this outside crust of the globe find that the earth must have been nearly in its present state for many thousands of years, but that, before that time, it must have been undergoing all manner of changes, which prepared it for being the abode of human beings. Some of these changes have been occasioned, it is supposed, by the action of fire inside the globe—some by the washing down and wearing away of water, and both these causes of change still go on, even in our days, as when volcanoes pour forth hot ashes and streams of burning lava, or the waves of the sea beat up against cliffs and rocl wear them away, or rivers wash down the s valleys. In this little book we are not going to teac all these changes must have come about, the knov of which makes up the science of geology; but w show how great an advantage it is to us that the c the earth, as we call it, is made up of a great n of different rocks and earths, which, at one time, have lain in a certain order one above the ot layers or *strata*, and then again been altered in p so as to bring to the surface *strata* which were, time, undermost.

The lowest rock in the earth's crust is the stone we call granite. Above this rock comes and limestones of different kinds; then sands chalk, and marl; and, lastly, clay, and sand gravel. The way in which these layers or *stra* now found placed makes all the difference to u we were to find a pile of books on a table plac above another, and all with different covers, we not tell without moving them what their bindir like, excepting that of the topmost one. If we the pile so as to make them all lie slanting each other, we should then see a portion of the b of each book; and thus it is with the *strata* which pose the crust of the earth.

As we travel in any direction and observ soil in the cuttings of the railroad, we ca that, for twenty or thirty miles, the banks will *one kind* of soil or rock and then change to an *and so on*, until, during a whole day's we may have passed over many varieties ; and if we continue our observations during many journeys in different directions, we shall find that all these different earths and rocks come in a certain order, owing to some having always lain above others, and never beneath. This enables people to know where to find different soils, and stones, and mineral substances, when they want to make use of them.

When in our country a particular kind of stone is wanted for building, it is known through the science of geology in what English county it can be found; and when clay is wanted for making bricks, or lime for mortar, it is known where to find these earths and where it would be no use looking for them; and so it is with slate for the roofs of our houses, and all the other varieties of stone for our churches and bridges, quays and piers. In some parts of England are to be found ranges of high mountains made up of limestone and slate. In Scotland there is found much granite, while in the southern counties of England are long chains of chalk hills, and in the east other districts where the soil is sure to be either gravel or clay.

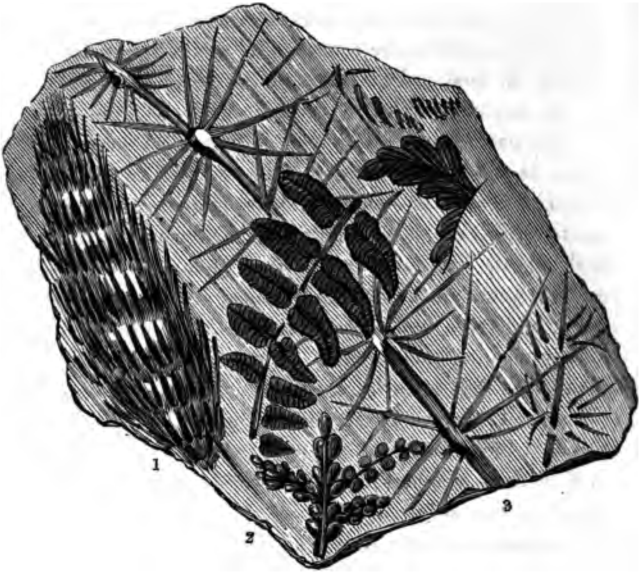
Among some of these rocks and earths are found the mineral substances which are called metals—iron, copper, tin, and lead; while gold and silver and precious stones are found in other parts of the world. They are found sometimes mixed up with different earths, when they are called ores, and sometimes in veins—some in one kind of earth or rock, and some in another. The metal most useful to us is iron, and of this a great deal is found in England. We turn it to a great many uses, and all the help we get from machinery is owing to iron. Without iron we could construct no steam engines, or railways, or have all the implements and tools required for thousands of useful purposes. Our manufactures of linen, and cotton, and woollen goods depend on iron, and we have even begun to build our ships of iron. If we had had mines of gold and silver or diamond in England, they would not have helped so much to benefit our lives as iron—which when hot, can be beaten into shape, or which can be melted with great heat, and then moulded into different forms, while it becomes hard and inflexible again, when cold.

After iron, perhaps the mineral substance which comes next in usefulness to us is coal. Coal does not form *strata* in the earth's crust, but is found in large beds among other *strata*. We call these beds coal mines, and thousands of human beings spend their lives in digging out the coal at great depths beneath the surface of the earth and bringing it up for the supply of our home fires, the furnaces of our factories, and for supplying the fires of the engines on our railways and in our steamboats. Our power of travelling about the land in railways, and traversing the ocean, and going to every part of the world, thus depends on coal. Useful productions, merchandise, and manufactures are carried about the world; comforts and conveniences are exchanged

by different nations, and even knowledge is spread through the help of coal.

Nothing that has taken place in the crust of the earth—none of the changes which prepared it for becoming the habitation of man—have been more wonderful than the origin of coal. We are told that when the surface of our island was quite different to what we now have it, when the climate was hotter, and when very different plants and trees grew upon it thousands of thousands of years ago—all that now forms our beds of coal was vegetable growth—swamps full of grass, and moss, and reeds, and ferns; and that these swamps were dried up and covered with other layers of earth and rock, and changed in the course of a vast period of time into beds of coal. Plants, as we have seen in another chapter, absorb or take in carbonic acid gas from the air. This causes them to be formed, in a great measure, of what is called carbon, as we know by wood turning to charcoal when burnt—charcoal being another name for carbon, while coal is also only another form of carbon, which shows the near connection there is between coal and vegetables. In coal mines, too, portions of plants, and trees, and reeds, and ferns, are often found half turned into coal, or with impressions of their delicate leaves left upon fragments of it.

We thus perceive by all these valuable mineral substances which form, as it were, the earth beneath our feet, how wonderfully the world was prepared for becoming the dwelling-place of human beings, and how substances that have no life are made to contribute to the life of man as well as that of animals *and plants. But* the different rocks, and soils, and earths might have remained untouched and turned to no account if it had not been for the powers given to men, which led them to discover their valuable qualities and make use of them for increasing their comfort; while the metals—the iron, copper, and lead, and the equally valuable coal—might have remained for ever concealed in the heart of mountains, or down in the deep mines, if men had not been made observing, inventive, and ingenious, and able to fit and adapt these substances to useful purposes, and make them supply the wants of life.



Impression of Horse-tail rush (1 and 3) and Fern (2) on Coal.

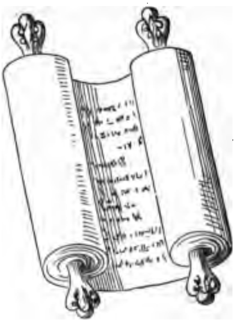
CHAPTER VI.

BOOKS; AND WHAT THEY ARE TO US.

THE knowledge gained by human beings in these days comes to them, for the most part, through books and newspapers. After first being in the minds of other men who have gained it by study, and by searching for it and observing, it is thus made to reach us. Books tell us also what has happened in the world in former times, and all that has been discovered and invented or produced by art. They record all there is to tell of the lives of men and women who have done great and good deeds, lived noble and useful lives, or have been distinguished by their learning or skill in painting pictures, carving statues, composing music, or writing what was intended to improve their fellow-men. All that has been discovered about the movements and natures of the heavenly bodies, and about the composition of the substances which form the crust of the earth, or are produced by it, is to be found in books. Newspapers tell us of all that is going on in the world now. They give us the history of the present day. Whatever happens, even in parts of the world the most distant from us, is recorded in newspapers. The supply of all this knowledge is owing to the art of printing, by means of which what has to be told or taught can be copied *thousands of times*, and made to reach the minds of millions of human beings. Nothing done by men is a greater proof of industry and skill than the art of printing, which was discovered more than four hundred years ago, and which has helped more than any other art to make life what it now is to us. Before the invention of printing everything that was taught through books had to be written by the hand. Writers, or *scribes*, were kept to make copies of what people wanted to be read by many others. The first copies of the Scriptures were transcribed by monks in monasteries, who spent their time in making beautiful copies on parchment of the Greek original or of Latin translations, some of which they adorned with beautiful borders and ornamental letters and delicately painted pictures. As the copies took a long time to produce, very few could have them, and the Bible was only read in churches. Of other books very few copies existed, so that only those who were educated in monasteries and convents could gain knowledge from books. No newspapers of any kind were published, and when events took place which had to be made known at a distance there was no better way of telling the news than by sending a man on horseback with a letter. Even from one distant city to another this would be done, as from York to London, or Paris to Rome. Men must have felt very strongly how much there was wanted a means of making copies of what was written more quickly, and they set about trying to invent methods. If engraved seals could imprint names or letters on wax as many times as they were wanted, men said to themselves that they ought to *find out* a way of imprinting all the letters and words *of a book*. After many trials, two or three ingenious men in Germany, about the middle of the fifteenth century, found out the method which we continue to employ in our days of imprinting or *printing*, by means of little raised letters called *type*, which are put together to form words, blackened with sticky ink, and then pressed on to paper. Wooden type was first used, and afterwards metal was employed, because they could be cast in moulds and made more quickly and in greater numbers. The discovery of this art made a greater change in the world, and led more to the spread of knowledge, and especially to the knowledge of Scripture, than anything that had before been discovered; and now, as we look back at the world's history, we cannot but perceive how much the invention of printing, about a century before the time of Luther, was a most powerful assistance to him in bringing about the change in the Christian Church which is called the Reformation. He aimed at nothing so much as that men should be able to read the Bible for themselves, and after translating it into German, he was able by means of the printing-press to spread copies of it among the people; while in England a translation of the Scriptures was soon after printed by Caxton, who was our first English printer.

The invention of printing, however, could never have been turned to such good account if it had not been for the making of paper, and the art of manufacturing this useful substance was found out just in time for best turning to account the invention of printing. Thousands of years ago there was no better substance for *writing-paper* than parchment, which is made of *the skins of* different animals flattened out and smoothed. The other substance used was made of the stem of a particular kind of rush, which grew in the mud of the river Nile, in Egypt. The rush was called the Papyrus, and this name, used so very long ago, is the origin of our English word *paper*. Thin layers of papyrus stalks beaten out and cemented together made a good material for writing on, and long rolls of papyrus formed their books, on which the writing was, in upright columns about three inches wide; so that the book or scroll could be read bit by bit as it was unrolled in the hands of the reader—one end being rolled up again as the other was unrolled. Parchment books were also of this form in ancient times, and is the origin of our word *volume*, which comes from a Latin word for rolled. When Jesus in the synagogue at Nazareth read a passage from the book of Isaiah, the Hebrew prophet, it was no doubt from such a scroll that he read; and in the Jewish synagogues of the present day, the Hebrew copies of the Old Testament from which they read during their services are in the same

form. Very much more convenient is the form in which we now print our books, and much more plentifully can be supplied the substance we call paper, which is made of rags boiled to a pulp and then rolled out and smoothed by machinery.

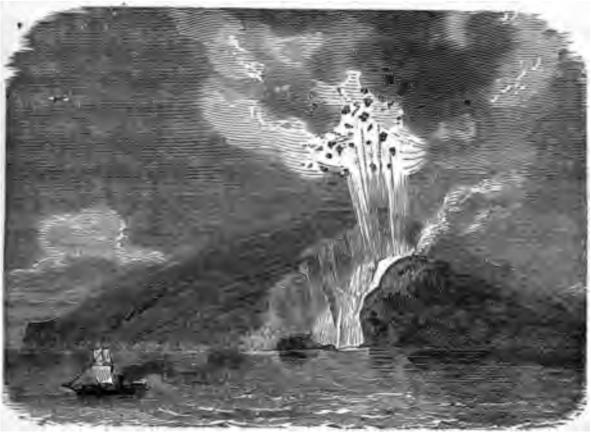


When we remember all that is done in the world for the improvement and benefit of mankind through the arts of printing and paper-making, we cannot doubt that it has been part of the purpose of God towards us that such discoveries of means to supply wants should be made by men. They help towards the progress of human beings in all that is good, and tend to their bringing to perfection all that they are capable of attaining to; and now in these days when books contain all that has been discovered or recorded by men, when we have once learnt to read, we may be said to possess a key which will unlock to us all the treasures of knowledge that exist in the world; and there is nothing that we should more ardently desire than that every human being should be helped by education to get all the knowledge which is contained in books, and especially that the best kind of knowledge should be put into books. A good book carefully read and understood will sometimes lay the foundation of a good and useful life. We have lately been told, in the life of a great man—the celebrated chemist and philosopher, Faraday—*that when* a boy he was apprenticed to a bookbinder, and, happening one day to notice the contents of a work on chemistry which he was employed in binding, his curiosity led him to read the book, and the knowledge it gave him so interested him that it determined his career in life, and became the foundation of many wonderful discoveries made by him in the science of chemistry, which not only benefitted the world, and helped others to learn many of the wonders of creation, but brought much good fortune and fame to himself. A taste for reading is in fact a certain source of pleasure, while a desire to gain knowledge through reading is a certain source of still more lasting happiness. Through the reading of good books we hope for the decrease of vice and crime, and the spread of true religion; and we trust that the time may come when men will learn from books still more of the wise designs of their Creator towards them, and be more and more desirous of making their lives conform to His will.

CHAPTER VII.

STEAM; AND WHAT IT DOES FOR US.

After having shown how all animal and vegetable life is dependent on water, and its uses to human beings, we have still to show how one of the states or conditions of water influences our lives and habits, and forms one of the most important of the powers of nature which men have under their control. In what we call ancient times, a great deal of attention was paid to all that was uncommon and unusual in what went on in nature. Men did not care so much to understand what they constantly saw going on around them as what startled and surprised them. Everything that was extraordinary or striking was duly noticed and noted down. Eclipses, earthquakes, the eruptions of volcanoes, and all such appearances or phenomena, were studied by naturalists, and endeavours were made to explain their causes; and thus, as we have shown in former chapters, a great deal was at last discovered about the motions of the earth and its relations to the other heavenly bodies, so that men came to know the reason of the changes of light and darkness, of hot and cold seasons, the causes of storms, &c. The power of the magnet had been discovered, and the mariner's compass invented, which helped men to navigate the ocean. Many ingenious machines had been made to save labour, and many useful substances found out and brought into use, and yet no one had ever suspected that what they saw happen every day when water was boiled would prove one of the most wonderful powers, when turned rightly to account, that the world had ever seen, and would do more to change the manner of life, and add to the knowledge and comfort of the human race, than any other previous discovery. We cannot go back far enough in the history of the world to the time when men first discovered the use of fire in softening and rendering more palatable substances used for food. The most savage tribes of men to be found on the earth in these days have ways of producing fire. They get it by rubbing pieces of dry wood together and by striking flint with iron, so as to enable them to roast and boil animal flesh and roots for food; and perhaps when the very first vessel of water was boiled on the fire of a party of savages they would notice the rising up into the air of the vapour which boiling water gives off, and which we call steam. It may be that in the neighbourhood of volcanoes—in Iceland, in the Island of Sicily near Mount Etna, or in South Italy near Vesuvius, and in other volcanic regions and islands—seeing how the internal fires of the burning mountains boiled up the water of the reservoirs within them, and caused vast jets and columns of steam to issue forth, as well as clouds of smoke and streams of lava, men may have had first suggested to their minds the boiling of water. It is certain, however, that for many long ages they must have boiled water, and seen steam, before it occurred to the minds of one or two enquiring and observing men at the end of the last century that the light and subtle vapour which rose up from boiling water had a *force* in it, and was a power that could be made use of to move machinery, so as to help in all manufactures, to lift weights and turn wheels, and be so applied that it should supply the place of horses in dragging carriages on land, and of wind in propelling ships on water.



We are told that the mind of a thoughtful and ingenious mechanic was one day led to enquire, as he saw his mother's kettle boiling and the steam issuing from the spout, what would happen were he to stop up the spout and prevent the issuing of the steam. Trying if he could do so with the help of a cork, the result was seen to be, that the steam must escape *somehow*, and therefore it forced up the lid of the kettle. That simple fact duly noticed was the first step in the invention of the steam-engine. Steam, when pent up and not allowed to escape, has a strong force or power, while at the same time it has a tendency directly it is cooled to return to water. If we put it into other words, we may say that great heat drives the particles of water asunder, and then it becomes steam; take the heat away, and the particles unite again and form water. The ingenious mechanic Watts pondered these facts. He thought and experimented and made very many attempts to turn to account this force which he found in steam, in order to render it a servant of man. He spent years of his life in applying it to machinery, succeeding in some attempts and failing in others from time to time, but, like a wise and practical man, persevering on and letting his very failures teach him new facts and truths. He was sure that somehow steam could be made to do what the force of water did in watermills, and what wind did in windmills and in filling the sails of ships. It could be made to work in the place of horses, and could be made to spin and weave and perform a thousand processes in manufactures, leaving men and women only the light and easy parts to do, and such operations as must always have the human mind to watch over and assist. At last the steam-engine was constructed, which does all this—improvements and alterations in the method of its construction having been made from time to time during the last fifty or sixty years, while the expansive power of steam and its readiness to condense and become water again is always the means by which the moving power is gained.

Those who are now old can look back and remember the many trials made before the steam-engine was brought to the perfection to which it has now reached; especially can they remember how wonderful it was thought when a boat was first moved on a river by steam; and they can call to mind when a clever workman of the name of Stephenson first thought of how steam could be made to move carriages on land where bars of iron (or, as we call it, a railroad) were first laid down for them to run upon; and, as they have lived on from childhood to age, they have seen how by degrees all these applications of steam-power have led to great changes in the lives and habits of all the people of the earth, and helped greatly towards the prosperity of all the nations. They feel what great benefactors to their fellow-creatures have been these men who have so helped to turn to account the powers of nature as to make them assist in promoting the comfort, convenience, and knowledge of their fellow-men. They reverence the names and do honour to the memory of Watts and Stephenson, because it was not a lucky chance that made them so apply the powers of steam, but because fine and noble qualities in the minds of these men helped them through difficulties and trials of all kinds in bringing their inventions to perfection. They had patience, industry, and perseverance; but even these qualities would not have been enough, if at the same time they had not been *good* men. They were men who strove after the right in all things, and who commanded respect and won confidence, and thought more of the good that would come to the world by their inventions than of their own gain or repute.

And when we see steam-engines at work, the great pistons moving up and down so regularly and smoothly, the wheels revolving and spindles twisting, it seems at times as if the machinery were a living giant, who thought out his work and had a mind which ruled and governed all the different motions; but then we remember that the water, the steam, and the iron are after all but senseless agents brought under control by the minds of men; while their powers and qualities were given to them by the great Creator of the universe, whose will it has been that they should be so turned to use. Nothing can have been discovered by man, that it has not been the will of God that he should so discover. No changes can at any time be brought about in opposition to that will. As men have become very numerous on the earth—more and more countries and tracts of land becoming inhabited, more and more towns being built, and our cities more and more crowded with inhabitants—we have needed all the aid that has been given us by steam. It has helped us to get the materials for clothing and many of the necessaries of life cheaper and better. It has enabled us to move about more on the surface of the earth. It has caused us to visit distant countries, and get from them useful commodities—all kinds of animal, vegetable, and mineral substances. Millions of human beings are supported by the manufacture of all the articles of convenience and luxury which steam enables the different nations of the earth to first produce, and then to exchange with one another. All discovery, all invention, and all the progress made by human beings are brought about by means provided by the beneficent Creator of the universe, who, in making the world and all things in it, has been at the same time the tender and loving Father of the human race, purposing that men should rise higher and higher in all that makes them worthy to be called the children of God.

CHAPTER VIII.

VERY LONG AGO.

After having taught that the earth was a long time in being prepared for becoming the habitation of human beings, we must point out that the human race has also been a very long time undergoing preparation, and, through the growth and increase of men's powers of mind, becoming more and more fit for making use of all that the earth contains and produces. At one time it was thought that men first began to live on the earth about six thousand years ago; but it is now known that there have been human inhabitants of the world for a much longer time, probably for hundreds of thousands of years. But these very ancient human beings must have been very different from the men that are living now in countries that are at all civilised. They must have more resembled the wretched savages that are found in Australia and the southernmost parts of South America. Traces of such very early races of men have only been found during the last twenty or thirty years; for they were too barbarous to have built any edifices that could possibly have lasted till our time. They left no tombs or temples like the Egyptians, Assyrians, and Babylonians, to tell of their skill, and habits, and religion; even their bones, for the most part, had crumbled away or been gnawed and eaten by wild beasts, or dissolved in water.

We have most of us read the story of Robinson Crusoe, and remember how, when he thought he was the only human being in his desert island, he was startled and surprised one day at finding in his walk on the sea-shore the print of a man's naked foot upon the sand. It spoke as plainly to him as possible, that, while he had fancied himself quite alone, other men had certainly been there. Equally perplexed were those who first found traces of some very ancient races of men, that must have lived upon the earth at a time much too far off for any record to be found of them in history, and even so long ago as when there were some animals existing which have long since died out and become what is called *extinct*, and which are now nowhere to be found in any part of the world. These first human beings who inhabited the earth, seem to have had but one object in their lives, and to have known but one art—the object was to get food, and the art was the making of weapons with which they could contrive to kill the wild animals around them. Under the soil on the floor of caves in several parts of Europe and America have been discovered, amid the bones of many kinds of animals, rudely fashioned hatchets and knives of flint, and sharp-pointed arrow-heads also of flint, which must have all been used by men for killing wild beasts, shooting birds, and spearing fish, thousands and thousands of years ago.

The men who made and used these weapons must have lived in the caves where they were found, and *have carried there* the animals they contrived to kill or capture. Even in England there are several caves containing such remains—large, sharpened pieces of flint, which must have been fastened to handles for hatchets, and smaller ones for spears and arrows, and with them the bones of many animals that no longer live in England, such as the rhinoceros, tiger, and bear. In Switzerland there have also been discovered traces of very ancient races of men who must have lived in huts built on upright stakes, or piles, in the mud of lakes; where, surrounded by water, the people were out of reach of the wild beasts who would have preyed on them; and in the mud around these stakes have been found the bones of the animals and fish on which they fed, and even the remains of fruits which no longer grow in Switzerland.

By examining many of the remains found in different caves and in the mud of lakes, it has been even possible to trace out the improvement which must have taken place in succeeding races of these first inhabitants of the earth. Among the contents of some of the caves, and in some of the lakes, have been found fragments of rude pottery and weapons of bronze, which is a substance made of copper and tin mixed together; and in other places there have been discovered signs of still greater progress in civilisation in the presence of iron weapons, which must have taken much more skill to fashion, because iron, before it can be used, has to be separated from the ore, in which it is always found. Rude patterns, and even pictures of animals, too, have been found on some of the horn handles of hatchets, from all which, it has been easy to see that more and more skill and cleverness was gained by successive races of these ancient men, until at last they must have nearly arrived at the degree of civilisation which had been attained by the islanders in the Pacific Ocean when they were first discovered by Columbus. In after ages they became like the inhabitants of Britain in the time of King Alfred, and then gradually improved through all the long centuries until they have become at last the races of civilised men now living.

It is very interesting to think of the contrast there is between the state of civilisation reached by the greater number of human beings in these days compared to the savage men who were our ancestors; and we cannot help seeing that the great Creator has intended that men should gradually improve, and that *the difference between* them and animals in the first instance was this *capacity for improving*. No animal living now is more knowing or clever, or can do more, than the same kind of animal thousands of years ago: but we see that the wretched savages who dwelt in the ancient caves, and left traces of their existence in the pieces of chipped flint, had within them the power of doing things better and better, and of learning and observing, so as to know more and more.

The children of such men, no doubt, improved upon what their fathers had done, till men came to be builders of huts instead of dwellers in caves, and then cultivators of the soil instead of only living on the animals they killed in the chase and on wild fruits; and so on, till they came to be builders of grand cities, and manufacturers of beautiful fabrics, and inventors of wonderful steam-engines, and artists in metal and stone, and writers of books, and discoverers of how to print them, and makers of all the numberless objects which render our lives comfortable and pleasant, and give us knowledge and power. Such thoughts as these should make us very grateful; but they should also make us very humble; because, while we have done so much to improve some of our powers, we have greatly neglected others. It ought to make us sorry that, while the ages have passed away since men were only dwellers in caves and chippers of flint hatchets and arrow-heads, we have not become as good as we might have become, and do not live in such obedience to the commands of God as we might live. Too many of us are still vicious and ignorant for want of education, and too many are still in want of the comforts of life which others enjoy, and the nations of the earth are still too ready to go to war and slaughter each other. It is now nearly two thousand years since our Saviour taught how men should live together like brethren—children of one Father in Heaven; that we should love our neighbours (our fellow-creatures) as ourselves, and even love our enemies; but we are still very far off from obeying these commands of God given through Jesus Christ. Thousands more years must, perhaps, be passed over before these commands will be perfectly obeyed; but we can each in our own lives try to quicken the coming of such a good time, while we go on praying that the will of God "may be done on earth as it is done in Heaven."

CHAPTER IX.

BEAUTY, AND THE SENSE OF IT.

When we have called to mind all that is useful to us in the world, and all that adds to our comfort and the support of our lives, there are other blessings still bestowed upon us which, when we consider them, should fill our hearts with gratitude. We get so accustomed to having food and clothing, and light and warmth from the sun, and useful substances and objects all around us to supply our wants, that we take them and use them as if we had a right to them, and forget to be thankful for them; but there are times when we feel more especially the goodness of God, and our hearts are more particularly touched with a sense of his love when we perceive how beautiful He has made the world. But things might be beautiful and yet we not capable of seeing their beauty, so we have to be thankful also for having in our minds a sense of beauty—the power of being pleased by what is beautiful. Some people have more sense of beauty than others, and what is beautiful to some is not felt to be so by others; but there are things which form almost a part of our daily lives, the beauty of which all cannot fail to see. They would indeed be stupid and insensible who did not see and feel their beauty. In a former chapter we told how the flower or blossom was the part of the plant or tree which contains that which is afterwards the seed, from which other like plants and trees were produced. Let us now think of the goodness of God in making these flowers and blossoms so beautiful, and letting them be so great a pleasure to us all our lives. A human being would be very unlike all other human beings if he did not take pleasure in flowers. Even an infant will grasp in his tiny hand, and keep as a treasure, a few bright flowers, and when older will run about a field or lawn with delight to gather daisies and buttercups. No home is so poor but that it is made brighter and gayer for a jug of cowslips or primroses in spring, or some roses or pinks in summer, standing on a shelf or in a window. A man will walk many miles into the country away from a smoky town in order to bring home a branch of hawthorn, or dog-roses, or a wreath of honeysuckle. He is a rich poor man who has a little plot of ground in which he grows a few flowers, or even has but a window-sill on which he keeps some pet plants that he has reared himself, and that he watches and tends as they come into flower and grow to maturity; and he is a poor rich man who has a grand garden to walk in, but who does not observe or care for his beautiful plants and trees.

A story is told of a man who was confined as a prisoner in a fortress in Switzerland, and had only a little courtyard in which he was allowed to take exercise. Stone walls and a little sky above him were all he had to look at, when one day he perceived in his walk a little green shoot springing up between the stones of the pavement of the court. It became an object of interest to him to watch the little plant day after day, observing how it unfolded its buds, and how its stem gradually strengthened and thickened, and grew taller and taller, and then sent out fresh branches and fresh buds and leaves.

Each day, when the hour came for his walk in the court, he went eagerly to examine how his plant had grown, what new buds had formed, and what new leaves had opened out. He thought of his plant in the solitude of his cell, and counted the hours till he should see it again. At last he perceived signs of a flower-bud, and then his delight was very great. Day after day he watched the expanding of this bud into a flower. He saw it swell and gain colour, and at last open out its petals, or flower-leaves, into a beautiful corolla. All this so occupied his mind, and so interested and delighted him, that when, after a time, he was released from his prison, he was able to look back upon the time he had spent in observing and watching his prison-plant as the happiest of his life.

Amidst all the occupations and duties of our own lives we have not always time for studying so closely the growth of a single plant; but even the busiest life is made brighter and happier by the beauty of outward objects. We are often soothed amid cares and anxieties by something beautiful which *comes to us* as it were in our daily life—such as a rainbow; the sun setting amid golden and rosy clouds; the silver crescent of the new moon, with some bright planet near it; a starlight night; the frost on our window-panes in winter; or in summer, the scattering of soft white clouds over the blue sky in some peculiar and beautiful manner. All such things may become sources of pleasure to us, if we acquire the habit of noticing them.

By cultivating a love of beauty, we also gain a love of order, which is a species of beauty. We like to have cleanliness, and neatness, and order in our homes, and we may adorn the humblest of homes with a few prints, a few shells, a plaster cast, and a few plants, which, though of little money value, may yet be as full of true beauty as many a costly ornament in a palace. *A child at first* only delights in bright colours and

what glitters and sparkles, but when his mind has grown, he may learn to see beauty in the forms of things, such as the graceful curves and windings of shells, the wonderfully delicate construction of feathers, the shapes of many seed-vessels, such as the cones of fir-trees, poppy-heads, and acorns, and the elegance of ferns and flowering grass. With a magnifying-glass or microscope we are able to see with what wonderful delicacy and beauty many living creatures are formed which we have not before thought of or suspected. We can see how exquisitely formed are the wings of moths and butterflies, the gauzy wings of flies, and the wing-cases of beetles; how delicate are their antennæ or feelers, and how curious the form of their legs. The greater the power of the glass to magnify, the more wonders and beauties we perceive in many natural objects.

Most of us take delight in music, and are cheered and made happier by it, as children know who learn to sing at school, or as the dwellers in close streets, in crowded cities, or country cottages know, when a tuneful organ comes within hearing as they sit at work; while fine music, skilfully performed, raises the thoughts and feelings to God. We should never despise such sources of happiness, for they have been given by God, to cheer us and touch our hearts. We are the better for a sense of beauty, and the exercise of it often keeps us from being morose and gloomy. Those who have more of the sense of beauty than others often become what we call artists; they paint pictures, and carve statues, and compose music. Others are poets, who put into poems beautiful thoughts and fancies, and describe what is beautiful in nature. It has been intended by God, we cannot doubt, that artists and poets should produce what is beautiful for the good and pleasure of others, and in order to keep pure and elevate the minds of men.

A sense of beauty in outward things only becomes hurtful to us when it makes us indifferent to, or unmindful of, the beauty of goodness, or moral beauty —beauty of character. A mind full of love to God and his fellow-creatures makes a human being more to be admired than anything in the whole of creation, and the human countenance becomes most beautiful when it expresses such qualities. A loving smile from one who is kind and good is better than the most lovely flower, and we are sure to like, and admire, and think beautiful the faces of those who are good and amiable, and who show us kindness. There is no beauty in the faces of the wicked, and if we know that any one is cruel or selfish it takes away the beauty of their countenance; and it is quite natural that it should be so, for beneath the skin of our faces are innumerable little nerves and muscles, which are acted upon by the mind, and change the expression of the face, just as thoughts and feelings pass through the mind. They make us smile when we are pleased, and they make us frown when we are angry. This is why the faces of very young children always seem to us beautiful. They betoken innocence and freedom from guile. They seem to have newly come from God, and the faces of the old who have led good lives, and had minds full of good thoughts, and hearts full of good feelings, seem to us also beautiful, and we believe that such are about soon to return to the Great Giver of their lives.

CHAPTER X.

FAMILY LIFE AND LOVE.

In attempting to show the great goodness of God to mankind in providing all that is needed for our bodies, and in bestowing all the powers on our minds which help to make our lives full of pleasures and blessings—all this which we have tried to teach in these chapters, would be imperfect and incomplete did we not point out also how tenderly merciful the great Father of the human race has been in causing us to be born and live, for the most part, in families, and how all the relationships of life help to bring out the best feelings and affections of our hearts, and prove one of the greatest sources of joy to us. Our having these affections, and the power of loving, is a great boon to us. Almost the first consciousness of each human being on entering into life must be that of being cared for and loved. Even among savage tribes of men, mothers protect their offspring, and supply their wants. The human race could not have been continued if it had not been so from the very first, since every human infant comes into the world naked, and dependent on food from its mother's breast.

As races of men become more and more civilised, they go on bestowing, for the most part, more *and more care* on the helpless infant. The mother suckles the child, and the child seeks the breast of the mother, from a kind of instinct; but a mother who thinks and reasons, and knows facts about the nature of her child, takes all manner of care of it, and surrounds it with a number of safeguards to its health, and never wearies of watching over it and ministering to its comfort, ease, and pleasure. As the child grows up, it gradually becomes able to do without all this care; yet the sense of having been so succoured and protected by that tender mother more than any one else gives it the strongest feeling of grateful love towards her. It loves also, because it feels itself still loved with never-failing love. When becoming less dependent on its mother's care, it is then, perhaps, that a child feels sensible of the care and protection of its father. How safe the young child feels as he clings to the hand of his father when abroad; how certain he is that his father will protect him from danger; how he gets to know that while his mother is tender and loving, his father also loves him dearly, and has bodily strength to guard him from harm; and as he grows still older, how he makes the discovery that it is his father who provides the means by which he is fed and clothed, and sheltered in a home. Thus is drawn out from his heart, and becomes part of his nature, the love for both mother and father.

For the most part too, a child, as he grows up, has brothers and sisters, who, like himself, are receivers of the love and protection of their parents. The children play together and learn together and grow up together. The younger child admires the elder brother or sister for his or her superior strength and knowledge. He likes, on the other hand, to find himself more strong and knowing than his younger brothers and sisters, and is proud of having to help and protect them; while the elder ones are like teachers, to whom he looks up with a mixture of fondness and respect. All this makes up family love, and where homes are blessed with good fathers and good mothers, and the children have been brought up to be obedient to them, and kind and forbearing to one another, such homes are the happiest places on earth. The great happiness enjoyed in them makes it a hard trial sometimes for sons and daughters to leave them, and go forth into the world; and the strongest desire of their hearts when away is to return to them. Even the man who has left his home in early youth, and found friends in another country, and formed new ties there, still cherishes the remembrance of the home of his youth. He longs to see it once more, and if he have still a father or mother living, he knows that their hearts are yearning to see their absent son again. Among all the races of men, from the very earliest ages of the world, obedience and respect towards parents has been considered an obligation and a duty. When care is taken of an aged father or mother, and respect and love is shown to them,—when they are sheltered and supported and protected by their children or their children's children, we feel it to be a beautiful and touching sight, and we perceive how good it is that such feelings should have been planted in our natures by the God of Love. Only very lately it was stated by a benevolent statesman in Parliament, that in Ireland the number of persons who are paupers, and dependent on parish relief, is now less, in proportion to the whole population, than those in England; and the explanation of this was, that the large number of Irish peasants who have emigrated to America and our colonies during the last twenty years are now sending home to their parents and helpless relations in Ireland means for their support out of their own savings.

All the records of the human race in all ages have been full of instances of the strong feeling felt by parents for children, of children for parents, and of brothers and sisters for one another. When such affection is not felt, we think it unnatural and terrible. It is told of the person who first thought of and helped to establish the plan of sending letters everywhere in England for a penny stamp, that, at a time when letters were sometimes charged as much as a shilling for postage on delivery, he happened, as he was travelling in the north of England, to see a postman take a letter to a cottage, which, after being looked at by the woman to whom it was addressed, was returned to him for want of a shilling to pay for it. This the traveller found happened once every year, and that the letter so shown and taken away was from the woman's son in London. She was too poor to pay the postage, but her heart was cheered by the sight of her son's handwriting, and she knew by it that he was alive and well. Why should not this mother get her son's letters more cheaply and be able to afford to read them, and why should not all absent members of families be able to exchange their thoughts and send tidings of themselves to friends at home more easily? This was the thought that passed through the mind of the benevolent traveller, and he went home and reflected and planned how to secure cheap postage for the people of England, and never rested until he had brought it about. And in this way a source of great pleasure has been secured to millions of human beings; and, besides helping to keep members of families and friends united in feeling who are obliged to be separated from each other, our cheap postage has been a means of increasing commerce, and making this country, and all the countries which have adopted it, more rich and prosperous: and a mother's love for an absent son was the little seed from which has sprung all this great good.

Even war, in which men are engaged in destroying each other, and seem at times so savage and cruel, does not stifle the natural affections. During the late war between France and Germany, many anecdotes have been told of how, in the midst of bloodshed and cruel devastation, men's hearts could still be full of tender feelings towards the homes they had left. We have read of how a German soldier was seen sitting on the doorstep of one of the few houses left standing in a French village with a little child upon his knee, who was playing with him, patting his cheek and pulling his whiskers. "You seem to know how to make friends with children," said a looker-on to him. "I should think so," said the soldier, with a sigh, "for I have left four little ones of my own behind me at home in Germany."

Another touching story was told of a poor Frenchman at the siege of Paris having his face all crushed by the explosion of a shell. He endured terrible *torments, and had* scarcely the features of a human being left. With the greatest difficulty could he contrive to make the bystanders in the hospital understand him as he endeavoured to express a desire. At last they made out, from his faint attempts to speak, that he wanted to see his brother, who had been fighting by his side all day, and he entreated that he might be brought to him. Alas! his brother had been killed by the same shell that had so sadly wounded himself.

Perhaps there is no stronger feeling of compassion felt by human beings than that which we feel towards orphans—those from whom have been taken the love and care and protection of father and mother. In the laws of the Jewish people, which form part of their religion, we meet many injunctions about the pity which should be shown towards orphans, while the writers of the books of the Old Testament could find no better way in which to describe the mercy of God than by calling Him the "Father of the fatherless," the "Helper of the fatherless"; while they compared Him to "a Father who pitieth his children"; and in seeking to make men understand their true relations to God, Jesus did not describe Him as the great Jehovah, or the "King of kings," but taught them to think of Him and pray to Him as "their Father in heaven," while their relationship to one another was to be that of Brethren. The earthly love which exists between the members of a family was thus to become the pattern or type of men's love to God and to their fellow-men.

CHAPTER XI.

THE FOOD OF THE MIND.

JUST as food is necessary to the growth and strength and healthy life of the body, so is it necessary for the mind to have food, and to be made strong and active by means of the right kind of food. The life of the mind must be kept up with nourishment, as must the life of the body. A boy was once found in a forest in Germany who must have been left there when very young, and yet who had contrived to feed on wild fruits and animals, so that he had somehow kept himself alive and had lived there for many years by himself. His body had grown, and he could see and hear, but for want of some kind of food for his mind, he had grown up like an animal. He could not speak, though he had the proper organs of speech, because there had been no one to teach him the names of things and feelings, and help him to express his thoughts. The powers of his mind had not come forth. When he saw the sun he could not give it a name; he only saw its brightness and felt its warmth. Even if he thought "how bright it is," or "how warm it makes me," he could not put the thought into words. Another time, in Germany, a man was found who had been shut up for many years in a dark prison, and who had been only kept alive by a gaoler coming to feed him at certain times, but who never spoke to him. He had no books, and could see nothing. He forgot all that he had once learned, even how to speak intelligibly. His mind was starved for want of food, but it only required a little intercourse with others to bring back its power again, and in a short time he could speak, and tell all that he remembered of his strange imprisonment.

We see by such instances as these, how good God has been to us in causing us to begin our lives in the midst of others, and to have parents and friends who help us to use the powers of our minds. A young child learns to speak from hearing language spoken. He gets to know the names of things about him from hearing the names used. He learns to give those names himself to all the objects that he sees, and all the noises that he hears. He finds out the words which describe his feelings. He feels the sensation of hunger, and finds that he must tell some one that he is hungry, in order to get food—that he is thirsty, in order to get drink. He learns that a single object is called *one*—one ball, one cup, one piece of bread; that another added to it makes people call it *two;* and by and by he learns that he has five fingers on one hand, and that the five on the other hand added to them make people call it *ten.* He finds out that while it is light we all call it *day,* and when it becomes dark we call it *night.* He discovers that while other people call him by a name, he must say *I* or *me,* when he speaks of himself. In this way a child learns speech, and when the time comes that he has words enough, he asks questions of those about him, and then he begins to gain knowledge very rapidly, and his mind grows fast.

All this time he has learnt to do certain things as well as to talk and think. He has learnt to walk, to feed himself, and to put on his clothes; to toss balls and trundle hoops, and in his plays to imitate many things he sees grown-up people do. Then the time comes for learning to read; for being able to tell first the names of letters and the sound of them when put together into words, and to get thoughts from a number of them put one after another in sentences. Faster and faster his mind grows when he can read. He finds that books can teach him many things that those about him have not told him, either because they did not know, or because they had not time. He finds that while people cannot attend to him he can sit in a corner, and put all kinds of things into his mind from the little book he holds on his knees. When his mind is sufficiently strengthened for it, he goes to school, where more and more knowledge is given to him. He learns to write and express his thoughts in writing; to count and reckon with figures. He learns about the shape of the world, and how its surface is divided into land and water, and the names given to divisions of the land and water. He is taught something about all the different peoples of the earth. He learns by degrees all that happened in the world long ago—thousands and thousands of years before he was born; about what great men—the good, and wise, and brave—have done and said, and about all that has been discovered and invented by clever and ingenious men in all ages.

All this and a great deal more comes as food to his mind, and what makes it grow more than anything is *the power he* gains of thinking and exercising his mind in thoughts of his own. He begins to observe and find out for himself; and what we teach ourselves is very valuable, because, when so gained, it helps to strengthen the mind.

When the child becomes a youth, and is not obliged by others to go on learning, but can act for himself, it is a happy thing for him if he chooses to do so, and finds a pleasure in gaining more and more knowledge. He perhaps tries to learn other languages than his own; and studies geology, which teaches all about the changes which have taken place in the crust of the earth. He studies astronomy, and learns all that is known about the heavenly bodies—the sun, moon, stars, and planets, and their motions. He studies botany, which is the knowledge of plants and vegetable life; or he reads books of travels, which tell him about the different countries of the world; or beautiful poems, full of high and noble thoughts; or reads the lives of great and good men. All such study—such gain of knowledge—is good for him. It keeps out evil thoughts, and makes his mind healthy and strong, and is like good and nourishing food to the body.

Even better than knowledge is wisdom; and even a young child may become wise. He has gained wisdom when he feels the truth of what his parents and teachers have taught him about his conscience—that inward voice which he must obey if he wishes to be happy. If he has found out that he makes himself miserable by doing wrong, and therefore seeks to do right, he has gained the best sort of wisdom, and *learned* the greatest truth that any human being can *learn*. In every little event of his life he can act upon it. No day can pass that it will not help him; and he has gained the knowledge which will best guide him in his future life. A child, too, may learn the wisdom of keeping his mind filled with good thoughts and feelings, so as to prevent the entrance of bad ones. Bad thoughts and feelings are like unwholesome food, which we cannot digest. Perhaps the feeling in our minds, which keeps it most healthy and happy, is that of loving and the sense of being loved. When children love their parents and know that they are loved by them, they do not fear evil, or feel anxiety. They are full of trust that they will be taken care of, and be preserved from danger and sorrow. This is the feeling that we should have with regard to God. We should depend on His love, and feel trust in His wisdom and goodness. We gain this feeling by learning all about the beauty and fitness of everything that He has created, which enables us to see the tokens of His love in all that concerns our life.

That part of us which receives such knowledge as this, and feels sensible of the goodness of God, we are accustomed to call the "soul." We think of our souls or spirits as that which will never die, but will return to God on the death of the body. It is with our souls that we thank God for His goodness and lovingkindness to us, and that we pray with to Him for strength in our weakness, and help in our trouble. Our souls seem to be more *ourselves* than even our minds, and as we can feed our minds with knowledge, so can we nourish our souls with the holy thoughts and example of those who, in former times, *have felt,* more than the rest of mankind, the goodness of God, and the beauty of a life of obedience to His laws and commands. Especially are our souls strengthened, and our best desires and feelings nourished, by the records we have of the life and teachings of Jesus Christ. No life that was ever lived on earth was so full of love to God and love to man as that of Jesus, and no life that ever was lived so helped the world to a knowledge of God or gave such an example of obedience to Him.

CHAPTER XII.

THE GIFT MADE WORTHY OF THE GIVER.

WE see then that life is a very precious gift. With it we receive from our great Creator the means for its preservation and continuance through the formation of our bodies, and the abundant supply of air to breathe, and materials for food which the earth brings forth. We are born with instincts and desires which make us seek to preserve life. Our senses make us conscious of all that surrounds us, and the exercise of them brings us all manner of pleasures, as we see, hear, feel, and taste. Thousands of objects and substances supply our wants, and bring us comforts and conveniences, all of which are found either in the earth on which we dwell, or are the produce of it. We have powers in our minds for turning them to account, and putting them into numberless other forms for our use in life. From year to year, and from century to century, human beings make discoveries and improvements, which all help us to live more and more comfortably and easily. The more our minds improve, and the more we know, the more power we have. We have pleasure from the inventions of human beings, and we have pleasure from what is beautiful in nature. All the relations of life, as we live in families where we are loved and taken care of by parents and friends, and as we dwell in the midst of other human beings in cities, and towns, and villages—all this helps to protect us and render our lives happy. For all these powers, and all this fitness, and use, and abundant supply of what is necessary to us, and of what adds to the enjoyment of life, should not our souls be ever pouring out grateful praise and thanks to God? To have a constant sense of God's wonderful care and lovingkindness is a great source of happiness to us. It increases our enjoyment of blessings to think of the source from whence they come, and to feel that we owe them to the love of Him who gave us life. For the meanest gift given us by a friend we return him our thanks, and are pleased to receive the token of his love, and should we not give, in thoughts and words, our grateful thanks to Him who has given us all things, and made us all that we are?

But even gratitude is not all that is required of us. Life is not all comfort, and pleasure, and happiness. As we live, we meet with trials and disappointments. What we wish for does not always come to us. Pleasure that is ours for a time passes away, and happiness is often succeeded by sorrow. We are often separated by death from those we love. We have to suffer pain, and are afflicted with diseases, and ill health. Some are so poor that they cannot even secure to themselves the necessaries of life and the comforts enjoyed by the many. All such evils are not causes for thankfulness, but they can best be borne by learning to feel it as a part of God's will that we *should* so suffer; and that even by such evils good *may* be brought about in the end; and it is quite possible to find a high kind of pleasure in resigning ourselves to the will of God. Even amidst the greatest misfortunes of life there are ever arising some circumstances which cheer us, and prove to us that we are not forsaken. What we have fancied to be an evil turns out to be a blessing. In the lives of the good and great we very often find that a trial in youth has been the source of all the goodness and greatness, and even the happiness, enjoyed in after life. In reading the life of one great man, for instance, we are able to see that poverty and want were the first cause of his exerting his mind, so as to lead to his making great discoveries in the power of steam and the construction of steam-engines. In the history of another we find that his lameness when a boy led him to read history and old legends, and then to picture it all in his own mind, until he was able to invent tales and romances himself, so that he afterwards became one of the most wonderful writers of fiction that ever lived, giving pleasure to thousands and thousands of his fellow-creatures, and finding great happiness himself in so exerting his powers; while both he and the other great man we have spoken of, had the satisfaction of knowing that they had conferred lasting benefits on mankind, and in dying, left the world better than they found it, through their means. Pleasure and uninterrupted happiness do not always bring out the best powers of the mind, as sometimes trials, and sorrows, and want can do; and it prevents discontent and repining, when we fully trust in God, and feel sure that He will do what is best for us, in his Wisdom and Mercy.

But again, even submission to the will of God is not all that is required of us. We have had our lives given to us by Him, and we have to consider how best we can turn them to account. The precious gift should be used so as best to do honour to the Giver. We have shown how the life of human beings is a higher life than that of animals; but it is higher only in proportion as we employ rightly the superior powers which God has given. We have seen how within our wonderful and mysterious minds are folded up in earliest infancy, even when the young child is quite incapable of thought or action, many faculties and powers, which are afterwards gradually helped to expand by the minds of others who are about us, or who teach us. What we mean by education is, that we are so helped to bring these faculties and powers to perfection, by those whose own minds have grown or expanded. As in the small acorn there is something which becomes afterwards the mighty oak tree, so is there in the mind of the little infant something which is the *germ*, or beginning of its future mind and character, no matter how good, great and wise he may become afterwards as a man. Thus, in the mind of a certain little child born at Genoa in the year 1435, there was something which led to his becoming through wonderful courage, constancy, and perseverance, the great man called Columbus, the discoverer of America, who was the means through which, one half of this great globe became known to the other half, and was helped to become civilised. There was something, too, in the mind of the little child born in England, at Stratford-upon-Avon, in the year 1564, which afterwards became expanded into what made him the greatest poet that ever lived, so that we English people are very proud of the name of Shakespeare.

But great powers do not always lie folded up in every child's mind, and it may be useless in many instances for a child or young person to say, "I will become a great man, and my name shall be known to all the world for some wonderful discovery, or invention, or some remarkable deed or conduct." Yet there is no reason why even a child or very young person should not say to himself or herself, "I will become a *good* man or a *good* woman," for that would not only be a noble and right ambition, but one which would be sure to fulfil itself, were it adhered to with constancy and firm resolution; and though we cannot attain to wonderful powers of mind or talents and cleverness, because we admire such qualities in others, we can at least seek to imitate the *good*, and endeavour to make the most of such powers and abilities as have been given to us, and do well the duties which belong to our lot in life.

On the other hand, we may misuse the great Gift of Life, and turn it to no account, as it would be if an earthly friend gave us a beautiful musical instrument, capable of bringing forth sweet and harmonious sounds, and producing fine music, and yet which, when we did not employ rightly its strings, or its pedals and stops, nor care to perform upon it accurately, would bring out only jangling discords, so that it gave no pleasing impressions to the minds of others, and did no credit to the giver. We have to *be* all that we can be, and to *do* all that we are able. If we take pleasure in *merely indulging* the senses which are the same as those of animals, and occupy ourselves only in seeking what we shall eat and drink, and what clothing we shall wear, we are not seeking the highest kind of life; and the Great Teacher Jesus Christ rebuked such care by saying that life itself was more than food, and the body more than clothing. It corrupts the mind, and it does injury to the soul, when we make such pleasures the principal object of our lives. Our lives are so bound up with the lives of others, that every human being has duties to perform, and in seeing clearly what that duty is, and trying to perform it to the best of our ability, we gain a feeling of satisfaction and peace of mind which is better than any pleasure.

It is also good for us to use our minds in becoming acquainted with the works of God in nature around us, because they enable us to form an idea of His goodness and power. It keeps the minds of men pure and good when their thoughts are often turned upon the beauties and wonders of creation. It is as if they were constantly beholding God. A story is told by an old English writer,* of the people of Sidon being at one time in want of a king, and were determined only to choose him who should prove himself to be wise and knowing. The servants of the State met in council and decided that they would elect as their king the one who should the next morning be the first to see the light of the sun. The night came, and the moon and stars rose and set, and when morning twilight came the claimants to the crown came forth from the city to await the dawn. All but one turned their eyes to the East, and he, in spite of the wonder and mockery of the rest, stood steadfastly watching the West. Suddenly he exclaimed, "Behold the light of the sun!" and lo! upon the top of a high promontory which stood out into the sea was beheld reflected the light of the rising sun while the East was still in darkness. And they chose him as their king. And thus it is, that though we cannot see God, for He has never yet revealed himself to human eyes, yet they who rightly seek Him, may find reflected in his works, the light of his Wisdom and Love.

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* Thomas Fuller, D.D., 1605.

There are, then, three things which we should at least try after in life. First, the full use and exercise of our powers; next, the strict and careful performance of our duty; and, lastly, the endeavour to do as much good as we can to our fellow-creatures. And these endeavours need not interfere with each other. In making the most of our powers of mind and body we are sure to be best fitted for our duties, whatever they may be; and whilst performing those duties we can always find means to be of some benefit to others. The good Samaritan, of whose merciful acts we read in the Gospel, was, no doubt, journeying somewhere on his own affairs—his business, his duties—when he stopped and took compassion on the traveller who had been wounded and stripped by thieves: his good deed, as recorded by Christ, serving as an example to all mankind for ever after. As we pass through life, there are always times when we can raise up our voices in behalf of the oppressed, and try to promote justice and peace, while we can all of us do something to assist in the spread of Knowledge, and of *Truth.*

Life, then, is in some respects what we make it ourselves. The laws which relate to our own bodies go on acting independently of us. The earth rolls on in its course round the sun, and cannot be influenced by us, nor can it control its own course. The life of the tree is in accordance with its nature, without any power of its own to change or alter that nature; but we have the power in a great degree of making our lives what we please, and what they should be; and in faithful obedience, usefulness, and beauty, they can be made to resemble, and be in harmony with, all the rest of the works of God.

THE END.

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